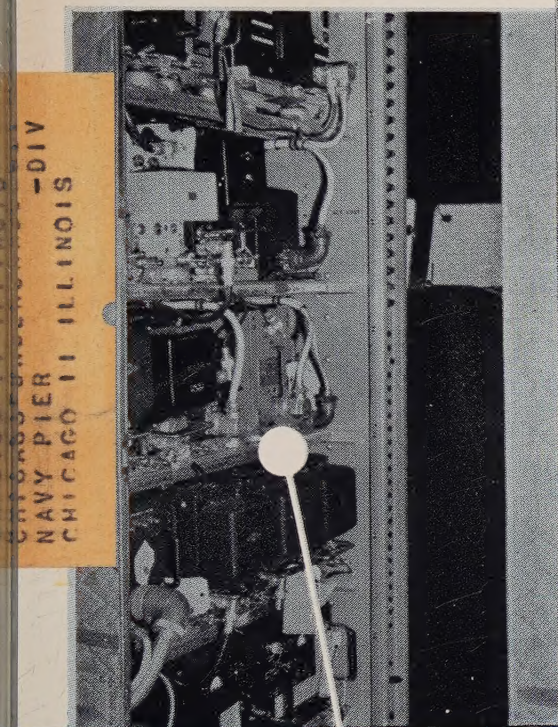


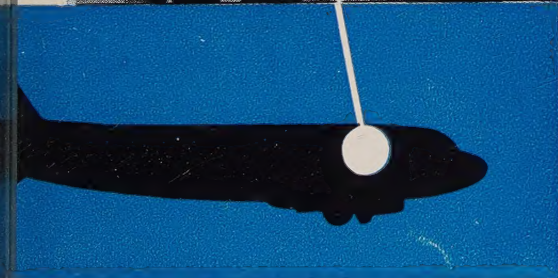
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FOR BUSINESS



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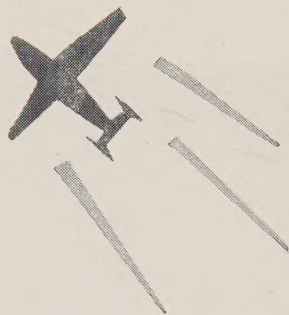
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Budgeting Maintenance
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FOR BUSINESS

The official publication of the National Business Aircraft Association

COVER: Demonstrating the Collins Integrated Flight System described in this issue are Clayt Lander, in the left seat, and George Flemming. Plane is Collins' Twin Beech. Rack installation is in Sears Roebuck's DC-3 of which Flemming is a pilot. Both NBAA members.

Editorial	5
Aviation Roundup	6
NBAA Director's Notes; Suite 344	9
First Learstar Makes Transpolar Flight	12
Pilot Report: 200 MPH+ — '58 Bonanza	15
Flight Report: Collins Integrated Flight System and Auto Pilot	17
New Air Space Policy A Challenge to All Business Aviation	18

NAVICOM

Cockpit TV Shows Aircraft Position	20
Low Visibility Approach Simulator by Doman	21
How GAFFG Plan to Raise Floor of Controlled Airspace Would Work	22
Helicopters for Business	26
Budgeting Maintenance	28
Aero Design's Wheel of Fortune	32
Law Behind the Skyways	34
Reading Aviation's Ninth Annual Meeting	39

Greenhouse Patter "Torch" Lewis	8	Canadian Reports	31
OX5	16	Safety Digest	33
Business Hangar	29	Maintenance	41
		Nu-Avi-Quip	47

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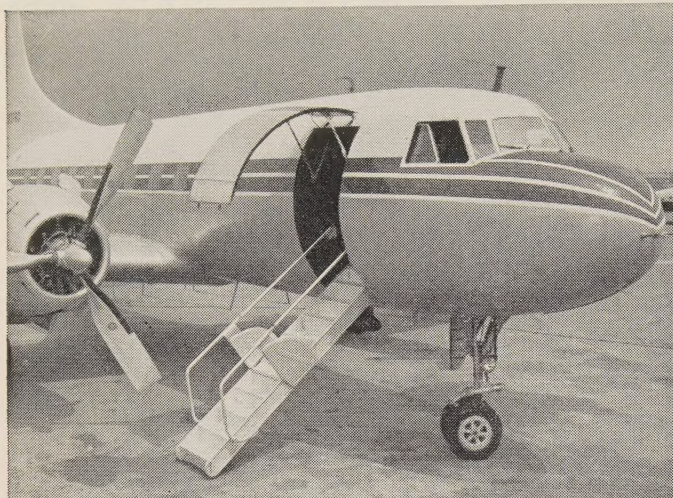
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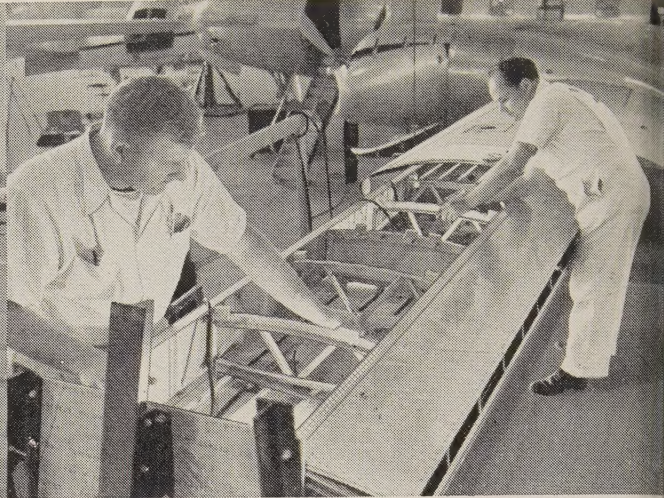


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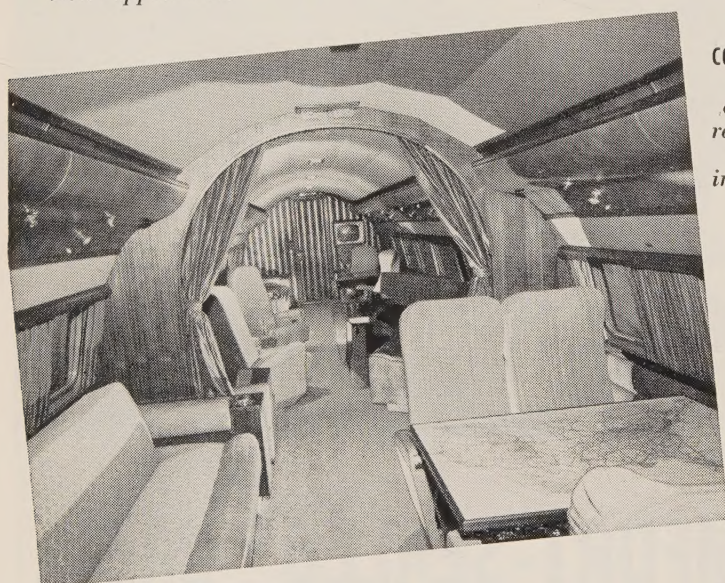
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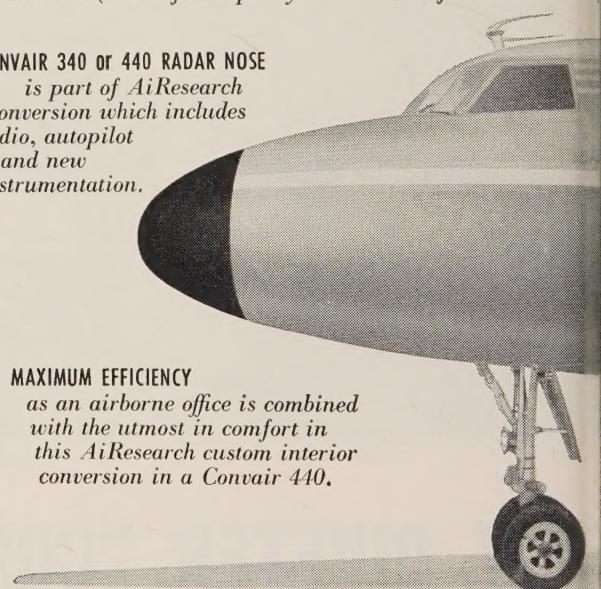
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Editorial

BUSINESS AIRCRAFT OPERATIONAL COSTS

Volume dollar sales in aviation products fall in the category with most other American industries by showing a 1957 increase over 1956.

However, true to form, this does not mean that manufacturers and suppliers have experienced any increase in net earnings. Conversely, while dollar volume sales are up, net earnings are down. Inflation is the culprit.

The aircraft materials price index averaged 152.0 in 1957 compared with 109.2 in 1950. These seven years show a price increase of 39.20%. The fact that it took nearly .4 more dollars to buy aircraft materials in 1957 than in 1950 can only mean that operational costs have likewise increased for business operators.

Add to these inflated costs the fact that surpluses for all manner of parts and accessories are about used up necessitating the use of more expensive new materials and the fact that increased taxes are being levied by the Federal Government, along with newly established local landing, take-off, and parking fees—we see a tendency that could result in the business aircraft being priced out of the market.

No human activity, including the operation of business aircraft, can be healthy and grow without economic justification. It might be to the mutual advantage of manufacturers and suppliers of aviation products to consider forming committees to work very closely with NBAA in an attempt to find ways and means of bringing down the cost of business aircraft operations. The same type of committee might well be formed with airport people. Everyone concerned should be interested in keeping the business fleet flying—and growing. Costs will prove a decided factor in the health of this vital segment of aviation.

EXPOSE THE MODERN JUDAS

There was once a soldier who lost step with his marching comrades. A perfectionist journalist with a very idealistic viewpoint was watching the marching troops and reported that the whole regiment was out of step. He was critical of thousands because one lonely soldier erred. It should have been plain that the mass of troops was not out of step—*only one man had lost the cadence.*

It's a queer thing but it frequently happens that some one will publicly criticize, if not condemn, the many for the errors of the few.

Any embryonic student of human nature should know that in any endeavor by groups of men, there will always be that infinitesimal minority who fail to measure up to the group's standard. It happens in government, among the clergy, in the military, in all types of business—including journalism.

But in a fair appraisal of human endeavors, one or two unreliable human beings have never been sufficient to condemn the quality of the mass. It should always be remembered that even Christ, in choosing twelve disciples, included Judas. But Judas' way was not the way of the Christian and Christianity therefore lived and prospered despite him.

With these thoughts in mind, it seems apropos to comment that the recent broad charge of an aviation magazine publisher that business pilots were accepting bribes and were therefore ruining business aviation, was unrealistic and unfair. At worst, his charge probably involved just a lone soldier or two who may have been out of step with comrades.

If this publisher has evidence of any indiscretion, widespread as he contends, or isolated, it is his duty to expose it. In exposing wrong doing he will have the support of the whole business aviation. It is also his duty, because of his power that tends to form public opinion, to point out that in the operation of 25,000 business airplanes it would indeed be a miracle if there were not a few dishonest pilots in the ranks.

Naturally, this Publisher has the responsibility of naming names. In doing this job he will have support of all the marching troops who are in step. Let his expose include only business pilots and suppliers who have been parties to the alleged bribery; he need not include anyone *outside of business aviation* who might have accepted a plush, reclining airline-type chair for personal use in the home.

FIVE MONTHS TO GO

Tempus is fugiting again! It may be difficult to realize but it's only *five months* until the scheduled 1958 National Business Aircraft Association Annual Forum will be held at the Bellevue Stratford in Philadelphia. Dates are Sept. 22, 23, 24.

It's none too soon to start arranging to attend this important meeting and insure yourself the latest information and data designed to help you with your business aircraft problems.

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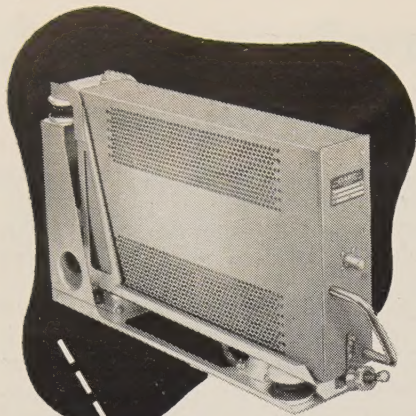
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AMB CHIEF E. R. "PETE" QUESADA AT AVIATION WRITER LUNCHEON in March revealed plans to implement experimental ATC Cent in New York to service test automation procedures and hardware being developed within "the current state of the art." Deadline for this phase of AM program is January 1, 1963. Future development program is under no such limitation, said Quesada and "the future (of the industry) is greater than the past"—a possible answer to the widespread negative talk so prevalent today. He also spoke of the development program for a "hyperbolic" IFR system for helicopters in which N. Y. Airways and Bell are cooperating. Quesada predicts that the aviation industry will be "hard core element of the national economy not unlike the role of the automotive industry in the past. AMB is currently conducting exhaustive day-by-day survey in the New York area hoping to be on the spot should a "Black Friday" ATC hassle develop.

★ ★ ★

NEW TWO-PLACE CESSNA 150 SEEN at Wichita, Kan., plant. Not yet announced by factory, the tricycle gear model is reported to be powered by 100-hp Continental, cruise at 115 mph. Cessna's response to the perennially popular 140. Estimated introduction late this year. Probable price about \$7,000.

★ ★ ★

DEHAVILLAND PROPELLERS FOR NAPIER ELAND CONVAIR 440 now the Canadair CL 66 Cosmopolitan. Constant speed and feather propeller 13 ft. 6 in. diameter with four wide-chord solid aluminum-alloy blades. Operates on "hydromatic" principle using hydraulic pressure to actuate pitch change mechanism. Incorporates new features for high level flight safety, control refinement.

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ROLLS-ROYCE DART COMPLETES 4,000,000 HOURS in airlines service on Vickers Viscount, operated also by corporations as NBAA'er Standard of California. Dart's success led to use in Fairchild F-27 "Friendship."

★ ★ ★

SCIENTIFIC USE OF COLOR in application of Day-Glo paint to New York Airways Vertol H-44 helicopters by Quantacolor color consultants. The fluorescent paint developed by Switzer Brothers offers safety factor of long distance visibility (See December '57, page 46); because of brilliance, offered problem of suitable application in quantity and with other colors.

★ ★ ★

GENERAL PRECISION LABORATORY GETS AMB CONTRACT for experimental air traffic control and data processing system. \$4,272,484 contract calls for design, development, fabrication of en route portion of Airways Modernization Board experimental semi-automatic data processing system for civil military air traffic control. Automatically performs routine non-decision-making functions for air traffic controller. Gives data for decision.

★ ★ ★

DOUGLAS AIRCRAFT CO. GETS SECOND AERO COMMANDER for executive transportation. Ted Smith, Aero Commander creator and vice president of research and development for Aero Design, was formerly with Douglas.

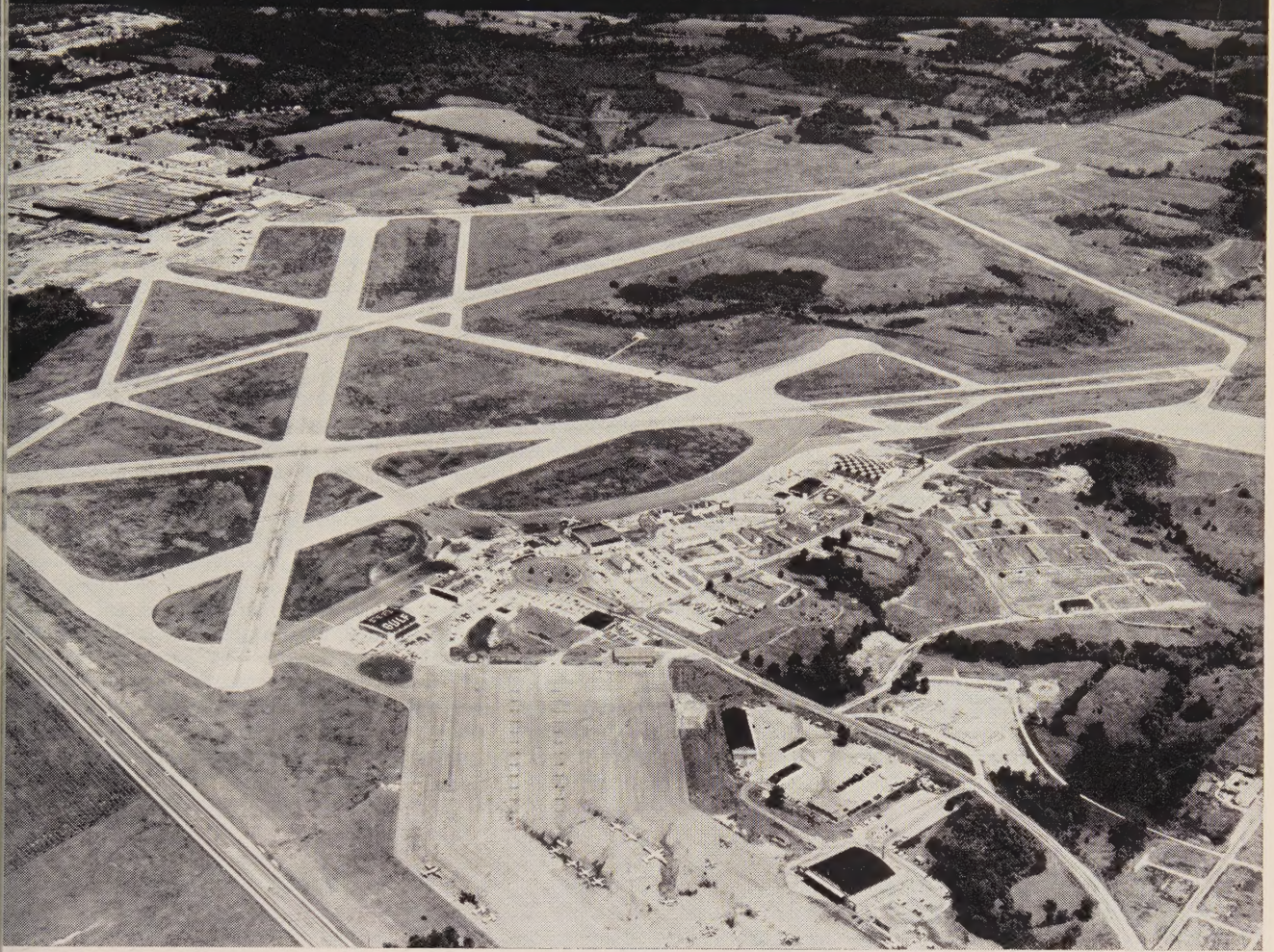
★ ★ ★

CAA FLIGHT TESTING CONVAIR 340 WITH NAPIER ELAND engine at PacAero Engineering Corp., Santa Monica, Calif., for certification in transport category. PacAero's performance improvement kit for Beech D18S under development. Flight tests on prototype anticipated to start soon.

★ ★ ★

BELL INTEGRATED INSTRUMENT COPTER TRAINER off Bell Helicopter Corp. assembly line at Fort Worth, Tex. Navy to use HTL-7 for basic and instrument pilot training. Model features dual controls, side-by-side seating for student and instructor. Powerplant is 260 hp Lycoming VO-435.

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Now test your aviation-oil memory: Do you remember these important reasons why Gulf oils are better for your engine?

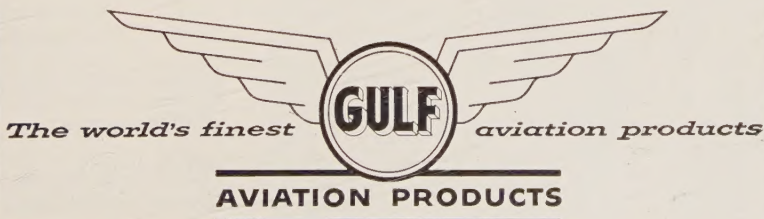
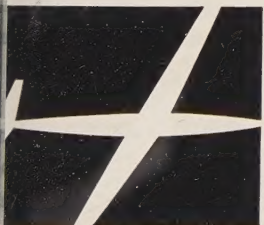
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The airport? It's Nashville's Berry Field, six miles southeast of the city, 5 paved runways, longest, 7,000 ft.

Here, you'll find that good Gulf Service under the supervision of Ed Jones, president, Nashville Flying Service, Inc.



Greenhouse Patter

By "Torch" Lewis

MOON OVER MIAMI DEPT.: IFR
—No other aviation term has provoked as much . . . controversy, been responsible for so much deserved profanity and caused as much confusion as this wretched phrase.

How many times have you been sitting clammy-handed at the yoke, sweat running off your nose and freezing before it hit the floor, de-icers going like crazy and receive a clearance so diabolical that it must have been months in conception, vengefully and patiently tailored for you and you alone. Black, black thoughts cross the mind and manifest themselves in colorful epithets which are hurled to the copilot for relay and he with awesome restraint transposes them into censorable FCC English.

Such was the setting as we were heading upwind toward Miami t'other day, five hours airborne, approaching Vero Beach. Miami is giving 14 0 100 0 visibility 12 miles but there is a 30 mile patch of rain betwixt. We request and are almost immediately assigned an altitude, routing Vero Beach, Belle Glade Intersection.

Approaching Belle Glade at 1450, ATC directed us to "hold northeast EXPECT APPROACH CLEARANCE

1700." In total disbelief we requested confirmation which came back at once affirmatively. Not having fuel requirements to accept, we were forced to return to Vero and take on a legal fuel load, receive new clearance which ironically enough was direct and unrestricted! Cheerfully would we have skewered the ATC controller responsible for this ridiculous procedure.

Two days later, we were ensconced in the office of Mr. Richard C. Dunlap, Chief, Miami Center whom we found genial, approachable, understanding, and a man who thoroughly knows what he is talking about. He had just finished a two page letter to me explaining how we could be issued a two hour and ten minute approach time 40 miles from a station which was reporting VFR conditions. Well, it seems that 1400-1700 is saturation time at MIA and at the time of filing, there were 26 flights to be landed before us and the separation had grown from 3 minutes to 5 minutes. The 26 flights having precedence did not include VFR operations.

After Mr. Dunlap had overwhelmed us with logic, we launched into a discussion of MIAMI ATC in general and what is being done to cope with the fact that Miami is the second busiest airport in the USA (Midway is busier) and still growing. The primary difficulty is the geography—Florida is a fairly narrow peninsula and the Amber 7-Victor 3 airway is the busiest in the

world. Miami tower handles about 1000 flights per day and reached a peak of 1596 on a busy day in 1957. On March 1st, the day we landed, there were 1102 operations of which 590 were IFR. There were 57 flights scheduled to land in the hour we arrived. Some of these flights come from South America and have no Omni or ILS Compounding the confusion are the IFR operations of Homestead SAC Base 20 miles away, Opa Locka Marine Base 5 miles away and the operations at Broward International 15 miles away. Add to these the International fly overs, the domestic fly overs, stir gently 365 days a year and what do you have. One helluva mess.

Dunlap went on to tell us that on January 2nd of this year, the MIAMI ARTC system broke down under the load and flights en route to Miami were instructed to land and sweat it out or face a delay up to seven hours! It was nearly three days before normalcy was restored—and normalcy at ARTC is flank speed.

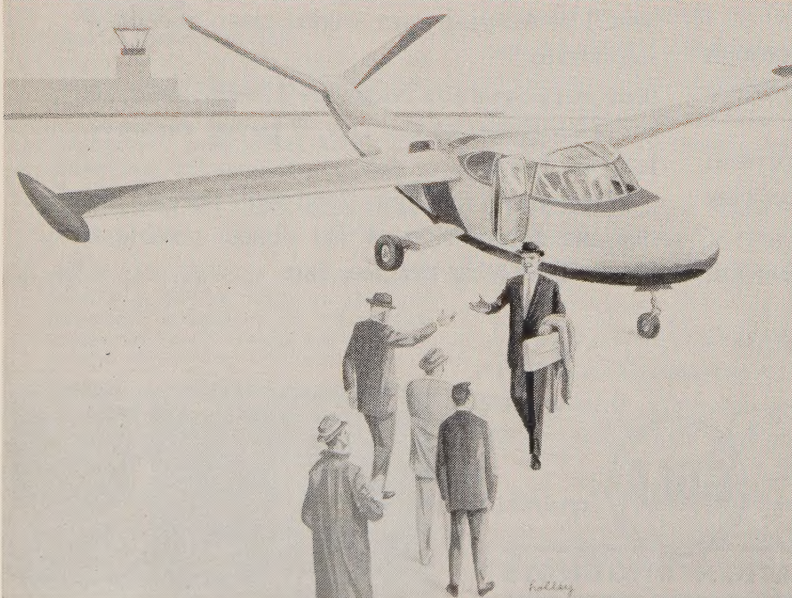
What is being done? Firstly, approach radar is now installed and will be operational in December 1958. Long range ATC radar is being installed and is but one year from activation.

Meantime, there is one thing that we can do which ARTC is not allowed to even suggest. CANCEL IFR as soon as practicable. Let go of it—leave off of it—as soon as you can proceed to Miami, the rest of the way VFR.

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six-cent-per-gallon aviation fuel proposed in Maryland, was effectively blocked several weeks ago by concerted action of NBAA, airlines and base operators.

The bill, quietly introduced in the House of Delegates and Senate, was passed in 24 hours of hearing stage before it came known to those who would have been paying the majority of the cost . . . to the tune of \$275,000 a year. Introduced at the request of a small number of private pilots, seeking to avoid existing aircraft taxes, the bill met with resistance when its true impact on the aviation community was revealed to the Maryland legislators.

Attempts by Chicago municipal authorities to set stiff landing fees at O'Hare and Meigs airports by business aircraft are meeting determined resistance. NBAA is actively

cooperating with local groups in the fight to prevent the proposed inequitable landing fee schedule from becoming law.

In dismissing the suit recently brought by groups of local residents which could have closed Newark Airport, Judge William F. Smith, United States District Court, stated:

"An injunction directed to these flight patterns (at Newark Airport) might well require not only the amendment of the present regulations but also a modification of the said operating specifications. There is clearly no such power vested in the courts. We are of the opinion that the solution to the questions raised . . . requires the comprehensive knowledge and expertise possessed by the CAB.

" . . . If the courts undertook, by judi-

cial decree, to promulgate regulations and establish flight patterns peculiarly applicable to each major airport—and there are one hundred and ninety-four—the uniformity contemplated by the Civil Aeronautics Act and essential to a comprehensive regulatory system would soon be impaired. The entire development of the air transportation system would be hampered by a myriad of judicially prescribed regulations of only local application."

Judge Smith's decision places air regulatory decisions in their properly and clearly defined status of federal regulation.

To permit local regulation would result in chaos.

Skyways will report on Oakland Air-motive's PV-2 "Centaurus," newest executive conversion certificated by CAA.

Bill Lawton

Suite 344

It's Cherry Blossom Time in Washington . . . that means SPRING is around the corner . . .

your records—and congratulate NBAA is now represented down "as Way" by Continental Oil Co., Houston, and have designated C. F. Sherman, Supt. Aviation Operations, as their representative to serve on the CAA's Board of Directors until next Annual Meeting.

WELCOME TO NBAA MEMBERSHIP—CALIFORNIA FEDERAL SAVINGS AND LOAN ASSOCIATION, Los Angeles, Calif., Savings and Loan Assoc., own and operate Aero Commander, Kenneth D. Johnson, President, Asst., is NBAA Rep. and Chief Pilot; KANSAS NATURAL GAS INC., Kansas, natural gas and oil production—own and operate Beech Bonanza—Ross Beach, Jr., President, is NBAA Rep. and Chief Pilot; LAKE SUPERIOR PIPE LINE CO., INC., Superior, Wisc., wholly owned and operated subsidiary of Interprovincial Pipe Line Co., engaged in transportation of Western Canadian crude oil to Eastern Canada through the U.S.; maintains a pipeline, DeHavilland Dove and two DeHavilland Beavers. U.S. portion of pipeline runs through North Dakota, Minnesota, Wisconsin and Michigan. C. Proudfoot, Chief Pilot, is NBAA Rep.; AMERICAN AIRMOTIVE CO., Miami, Fla.—overhaul, repair, and sales—Charles E. Lewis, President is NBAA Rep.; PESCO PRODUCTS DIV.—Borg Warner Corp., Bedford, O., mfgs. of aircraft pumping equipment, own and operate Aero Commander 520, Mervyn G. Wenzel, Chief Pilot, is NBAA Rep.

Members at National Headquarters certainly appreciate the time members take from their busy schedule to come in and give us the "gossip" around the industry.

Your President, Joseph Burns, attended the Air Force Assn. Jet Conference and took "one-hour" to visit with us. With Mr. Burns was his brother, Barney. Your Treasurer, John H. Winant, also visited with us. Stan Smith, New York Wire Cloth Co., was in. Told us as soon as his new Cessna 310-B has been equipped with all the necessary "gadgets" he will let us look it over to see if it meets with our approval. George Pomeroy, Swiftlite Aircraft Service, says he wants to retire one of these days—how long do you give him to get back in aviation? Herb Ackerman, SKYWAYS, was in. Herb had thirty-six places to go in four hours—Herb, did you finish? George Brewster, Chief Pilot, U.S. Weather Bureau, was in—George is the only person in aviation who worries about "no complaints." Otto Pobantz, Chief Pilot, Federated Department Stores; Charles Harmon, Jr., Chief Pilot, Lockport Felt Co.; Wells Forbes, Chief Pilot, and Bud Lyons, Scott Paper Co., and Bob Schmidt, Tucson Airport, visited us also.

MAILINGS: Instrument Approach Procedures on privately owned radio facilities; Repair and Alteration of General Aircraft—Flight Operations and Airworthiness Release #421; American Aviation Editorial entitled "Trouble Ahead" and NBAA's reply; Caribbean and Latin American Business Aircraft Flight Service; AD's to members utilizing Vickers Viscount, Piper PA-23 and Hartzell Propellers; Military "Non-Compliance" with air traffic Rules curbed by CAB (CAR 57-16); Status of Business Pilots Disability Insurance Program. (At this time, may we add that we have received many replies from pilots and companies very much interested in continuing this insurance program.)

Bill Lawton and Col. A. B. McMullen,

NASAO, (National Association of State Aviation Officials) have been working very closely for NBAA's and NASAO's annual meeting in Philadelphia. NASAO's meeting will immediately follow NBAA's at the Bellevue Stratford Hotel.

C.M.

NBAA Membership

Information regarding regular or Associate Membership in the National Business Aircraft Association is readily secured by writing to the Executive Director and Secretary of NBAA at 344 Pennsylvania Bldg., Washington 4, D.C.

Membership in this non-profit and independent aviation organization is based on the recognition of business flying problems common to all users of aircraft for business purposes and to those engaged in supporting the operation, servicing, equipment, and manufacture of business aircraft.

Among the fields in which NBAA is concerned are: improvements in airways and airports, better weather service, expansion in communications and air navigation facilities, higher standards of airport services, improved aircraft parts distribution, equitable tax rulings for business aircraft operations, greater recognition of the airplane as a necessary tool in modern business and industry, better air traffic control procedures, professional status for qualified business pilots, and aircraft designed to meet the special requirements of business flying.



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ST 7-9472

Aviation Roundup

NEW AIR TRAFFIC RULES BY CAB effective this month require conduct of most military operations under waiver of Civil Air Regs. Waiver to conform standards and procedures permitting operations to be conducted without hazard to other traffic even though flights are not in compliance with CAR. This consistent with original intent of non-compliance by military in connection with civil defense requiring deviation from Part 60.

★ ★ ★

DETEMPLE HELICOPTERS, INC., NEW FIRM to undertake advanced design, development of low cost, minimum size helicopters for commercial and military use. Firm at Los Angeles, Calif., headed by Donald E. DeTemple. Concentration to be on single and two-place copters for commercial market. Parallel civil rotor craft development will be studies aimed at military market.

★ ★ ★

EMERGENCY LANDING STRIPS fostered by truck coal operators in rough Kentucky terrain. At sites of coal stripping operations are potential landing fields writes Charles D. Richards, general manager, Truck Coal Operator, monthly magazine. "Were mountain top strip pits turned into emergency strips they could be seen from great distances," says Richards. Might save life, or lives, besides being convenient to business-private fliers where strips might be near towns, cities. All it takes is money.

★ ★ ★

ALABAMANS AWAKE TO NEEDS FOR BUSINESS FLYING FIELD Alabama Dept. of Aeronautics reports, as result of 1957 interest in airports shown by large number of requests for grants. Reason: increasing importance of airports as decisive factor in plant negotiations and locations; increased executive and business flying make airport necessary facility for small towns.

★ ★ ★

HUNTING AIRCRAFT LTD. IS NEW NAME for former Hunting Percival Aircraft Limited. Completes process of identification with Hunting Group of which it has been member since 1944. Hunting produces President, twin-engine 10-12 passenger executive plane used also for charter and aerial survey work.

★ ★ ★

ARINC TRANSPONDERS BEING TESTED by three major airlines cooperating in current service test with CAA to evaluate the Beacon system. Using equipment on hand, not necessarily meeting ARINC 532B. Some airlines already ordered Transponders. Equipment and airframe manufacturers "in urgent need of the information, says Airline Electronic Engineering Committee.

★ ★ ★

CAA'S PURCHASE OF SEQUENCE FLASHERS from Sylvania promise improved IFR approach conditions and possibly lower limits at 30 airports throughout the country. These systems are the same as those currently in operation at Newark; Cleveland; Idlewild International Airport, New York; Logan International Airport, Boston; and Los Angeles International Airport.

★ ★ ★

PIASECKI ADDS AERIAL JEEP AND SKY CAR to VTO field. Under development for Army, Aerial Jeep has ultimate civil market. Sky Car being designed with primary civil application. Details not announced at writing.

★ ★ ★

DATELINES: April 24-28, Flying Physicians Assoc. Annual Spring Conference, Phoenix, Ariz. . . . May 8-10, National Inter-Collegiate Flying Assn. Air Meet and Convention, Holman Field, St. Paul, Minn. . . . May 17, Armed Forces International

★ ★ ★

WHO'S NEW: J. R. K. Main, director, Civil Aviation, Canada's Dept. of Transport . . . K. R. Herman, C. G. Holschuh, executive vice president, Sperry Rand Corp. . . . J. A. Summer, manager, export sales, Lycoming.

the **TACTAIR**[®] automatic pilot

no. 1

is now the

business aircraft autopilot

In less than two years, the TACTAIR pneumatically-operated autopilot has become, by far, the most popular automatic pilot for business aircraft. In the past year, sales and installations of the TACTAIR autopilot have far outstripped sales of any other autopilot on the market today. Major manufacturers of business aircraft have selected the TACTAIR as optional, factory-installed equipment. Seven reasons explain why: ● ● ① The TACTAIR provides the pilot with the most help, operates with uncanny smoothness. ● ● ② The TACTAIR's Course Selector and Heading Lock system is unique, lets you "dial in" any course desired for en route flying, instrument approaches, radar vectors —with no confusing zero-heading on the DG. ● ● ③ The TACTAIR's pneumatic operation, completely non-electronic, adds no load to the aircraft's electric system. ● ● ④ The basic simplicity of the TACTAIR's design concept and installation, with no complicated feed-back system, greatly reduces probability of malfunction. ● ● ⑤ The TACTAIR cannot burn out or be damaged by over-riding controls. ● ● ⑥ The TACTAIR's light weight (less than 8 pounds) poses no weight problem. ● ● ⑦ The TACTAIR is backed by a nation-wide network of factory-approved service agencies.

*For more details on the TACTAIR, see your
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For 18 Years Specialists in Precision Aircraft Pneumatic and Hydraulic Controls



FIRST LEARSTAR MAKES TRANSPOLAR FLIGHT . . .

Record-making first polar-route flight by a business aircraft is chronologically "re-flown" by the author. Flight started in dark of pre-dawn hours ending nearly 24 hours later in pre-dawn dark of another continent.

A PacAero "Mark I" Learstar took off in star lighted skies from Santa Monica, Calif., and, almost exactly one day later, was delivered to its new owner in Dusseldorf, Germany.

How was this accomplished? Simply by routing, for the first time, a conventional business aircraft over the back way to Europe: the Learstar was delivered after an historic trip over the Polar Route!

Skippered by PacAero's chief pilot, Hal Herman, and assisted by PacAero's president, Vern Benfer, the Mark I made the transpolar flight in 23 hours and 58 minutes with one refueling stop of one hour at Frobisher Bay in Canada's Northwest Territories.

The standard production model Mark I, the first business aircraft to take the polar shortcut over the uninhabited tundra and enormous glaciers of the north country, was on a routine delivery mission.

With Captain Hal Herman, a veteran of 18,000 hours and a former Commander, USNR, was Captain Wilhelm Roemer-scheidt of Helmut Horten, GmbH, German chain department store operators; Navigator John Dohm of Pan American Navigation Service; and Vern Benfer, PacAero's president, who master-minded the flight and served as relief pilot.

Unquestionably, the most remarkable fact of the delivery flight is that it was made with a *standard* Learstar with *standard* fuel tanks, *standard* equipment, *standard* radio gear, flying *standard* techniques, and transitting the over-the-top route right on flight plan!

The story began two summers ago with Mr. Helmut Horten of Dusseldorf, Germany. After seeing the success of the Krupp Industries' Learstar operation, he decided he needed one to cover his many enterprises in Europe.

He ordered and received a standard production model Mark I with two R-1425 Wright Cyclone engines and the conventional radio package.



DUSSELDORF ARRIVAL of first business aircraft transpolar flight via Frobisher Bay, N.W. Terr., Prestwick, Scotland.

Last summer Mr. Horten ordered a sister ship.

When it was ready, Vern Benfer and Captain Herman weighed the various methods by which the aircraft could be delivered to the German customer.

Shipping was out of the question. They mulled over the cost and time of flying multiple routes to Dusseldorf and then Vern Benfer came up with the Polar Route.

From their initial study, it was determined that the Polar Route, never before used for delivery, would save both time and money.

John Dohm, a former airline navigator, was called in to check out the navigation.

He set up the route—great circle to Frobisher Bay, great circle to Prestwick, Scotland, and airways to Dusseldorf.

The brain trust IBMed all of the information.

Each leg was about 3,000 miles. The standard Learstar at slightly less than normal cruise power, has a range approximately 4,000 miles which would leave them with alternate fuel and enough for a pair of grandmas.

The aircraft had complete anti-icing and de-icing equipment.

The radio gear was equal to airline standards including Omni Receiver, Glide Slope Receiver, MN97F Omni-Mag Radio Magnetic Indicator, a secondary Omni Receiver, secondary Omni-Mag, Dual ADF system (Lear ADF I



Lloyd Walker



OWNER Helmut Horten, right, greets Capt. Wilhelm Roemerschmidt, left, and Vern Benfer, PacAero president, at arrival.

nsistorized]], Dual ADF Indicator, Three-Lite Marker Icon Receiver, VHF Transmitter and Receiver, VHF Receiver and the new Lear L-102 Autopilot.

very problem which arose fell over like a cardboard errier. Range, navigation equipment and ice-combatting de- s; normally limiting factors, didn't make a dent in the Learstar's operating specifications. The undeniable conclu- m arrived at was that an ordinary, unmodified Mark I, an its off-the-rack accoutrements, was a shoo-er.

o public announcement was made prior to the flight ecause the trans-polar crossing appeared to be an average ery flight!

or two weeks before the departure date, Captain Herman mputed daily flight plans, enjoying 100 knot tailwinds.

ronically, the winds shifted and the flight actually bucked inst headwinds for the entire journey; another solid mimony to the safety of the operation.

akeoff was set up for November 7. The Horten Learstar s grossed out at 24,000 pounds with full tanks of 1,340 ilons.

The crew checked the weather—terminals and enroute— n climbed aboard.

03 GMT—OFF THE BLOCKS

Captain Herman was at the controls and Captain Roemer- eidt covered the right side.

1847 GMT—AIRBORNE Manifold Pressure—45.5" hg
RPM—2500 HP—1425

1920 GMT—LEVELED OFF AT 13,000 FEET

MP—26.0" hg RPM—1900 HP—680

(Maximum cruise power for the Mark I is 890 hp but for this first leg of 3,055 miles to Frobisher Bay, about 50% power was set up.)

Fuel consumption started at about 95 gph and, as the gross weight decreased, went down to 87 gph to average out at approximately 90 gph for the first segment of the trip.

2002 GMT—OVERHEAD LAS VEGAS

Ground speed checked out at 272 mph. Cabin temperature was 70 degrees Farenheit. Crossed radio bearings confirmed the forecasted ground speed of 272 mph. The Learstar was on track.

2122 GMT—ABEAM SALT LAKE CITY

Flight watches were set up as in long range airline operation with four hours on and four hours off. However, the crew was so enamored with flight, the bunk was barely soiled, and Captain Herman gave up his left seat for short intervals of time only.

2359 GMT—ABEAM BISMARCK, NORTH DAKOTA

The weather was clear and cool. Flight plan winds held up and the Mark I stayed on the great circle track as if it were following a furrow.

("Every pilot dreams about performance and weather like that," Vern Benfer said later, "and it happened—smooth as silk and beautiful.")

0109 GMT—WINNIPEG, MANITOBA

John Dohm reported the ADFs pin-pointed them on track and on flight plan.

Vern Benfer relieved Captain Herman for a seventh inning stretch.

The outside air temperature read five below zero. The cabin temperature was still shirt sleeves.

True Air Speed checked out at 273 mph and ground speed was 269 mph.

0316 GMT—SHORE OF HUDSON BAY

Outside Air Temperature was 40 below zero at 13,000 feet. Cabin temperature was 70. Weather—CAVU. (Cont. p. 38)

CAPITAL AIRLINES

Selects **NARCO**

Sapphire **1016** radio



Narco Sapphire 1016 all-channel VHF communications units have been selected by Capital Airlines for installation in their entire fleet of DC-3 Capitaliners.

Operating principally within the "Golden Triangle" high-density IFR area, Capital's Sapphire 1016-equipped aircraft will have complete coverage of every civil frequency in use or contemplated—with 50 kc spacing. The Sapphire 1016 provides 360-channel transmitter capacity and 560-channel crystal-controlled receiver capacity including all NAV channels, from 108 to 135.95 mc.

Capital Airlines selected the Sapphire 1016 after careful evaluation of all available equipment and exhaustive on-line testing of the Sapphire 1016. From the standpoint of weight, flexibility, performance and cost, the Sapphire 1016 proved far superior.

The Sapphire 1016 has become the logical choice for hundreds of pilots operating executive aircraft, too. If you are interested in airline quality at sensible cost, investigate the Sapphire 1016. See your Narco dealer or write for brochure.

FOR MAXIMUM NAV/COMM FLEXIBILITY - NARCO

Sapphire **1016**



TSO'd for scheduled airline use. Provides automatic crystal-controlled operation (SCS or DCS), or independent transmitter and receiver crystal selection, with optional dual control heads. Receiver range covers 108 to 135.95 mc including all NAV frequencies permitting crystal-controlled NAV tuning when VOR/ILS NAV unit, such as Narco VOA-3, is attached.

Send for brochure and data on amazing new "2½ Sapphire 1016" system.

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National Aeronautical Corporation, Fort Washington, Pennsylvania

MARK OF THE FINEST COMMUNICATIONS

Sapphire **1016**

**90/360-CHANNEL TRANSMITTER
90/560-CHANNEL RECEIVER**

200 MPH + — '58 BONANZA!

by Gordon Edwards

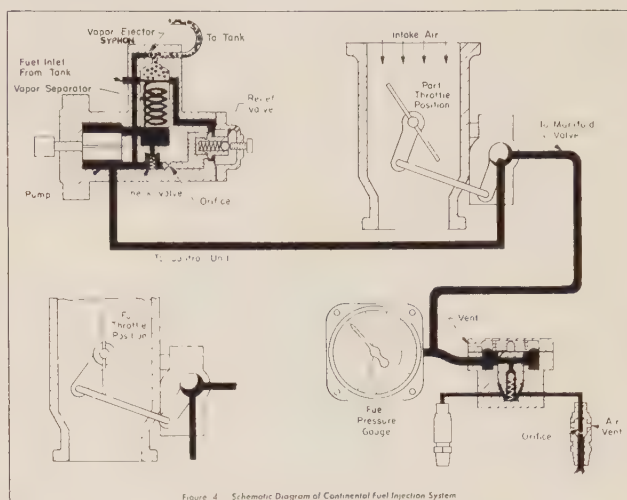
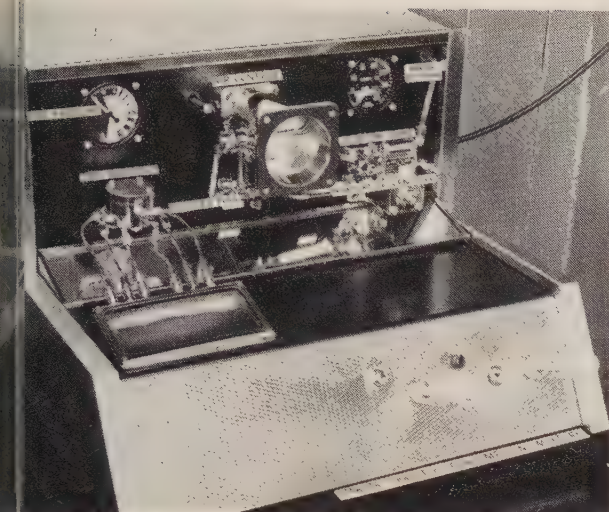


Figure 4. Schematic Diagram of Continental Fuel Injection System

Fuel injection system on J-model Bonanza adds new quality reported by check pilot.

The traffic pattern at Teterboro was the usual fair weather rat race. School plane after school plane wallowed and the circuit, ricocheted off the runway while I tried to be patient. Behind my club's C-35 Bonanza I was ferrying to Mattituck's paint shop 85 miles east, sat Gene Larimer, VP for Atlantic Aviation Corp., in their new J-35 demonstrator. Gene was my transportation back from that two-days-a-day hamlet on the east tip of Long Island.

Over-extended downwind and base on some student's gave me my break. The tower approved an "immediate" departure, and "Baby Doll" rolled but good! As I tucked clear away and off-sided the runway to clear my wash for the tower, I heard the tower negate his request to squeeze him too. Pinned to the taxi-strip for another ten minutes, I was probably fuming when I heard him finally get the word. I was coming up on New Rochelle, our first agreed check point on a Bee- (for Bonanza?) line to Riverhead. When "zero eight Delta" came over on Unicom, after seeing TEB's pattern, Baby and I were winding our way through scattered at four to five thousand over the Sound approaching Oyster Bay. Determined to needle Gene just a bit, I gave Baby the prod for maximum cruise and, concealing the radio garbage extruding all over, an on-the-step Air Speed of 168-170 I figured would really sweat him to catch me, even if he firewalled the "J" in true salesman

Riverhead was CAVU except for a large smoke pall from the north shore that overhung Mattituck down to about 1,600 feet. When I called Gene to give him pattern and his signal strength on reply startled me and I was hanging real hard as we broke underneath the level of the clouds on opposite sides a mile apart.

Mattituck had a large puddle about midway on the 2,200-foot strip which we both boosted over and Gene happily

unwound his big frame from the trim green beauty as I rolled to the line behind him. I was :35 from takeoff to touchdown, including climb and pattern, Gene was about :25. With the strong north wind, he had reason for the big grin. He knew that only a guy that "lives" in a Bonanza could appreciate the point.

Completing my business with Mattituck's affable Parker Wickham, Gene and I turned to the very necessary and agreeable chore of pre-flighting and cockpit checking the '58 model. In lieu of raving about the aesthetic vision presented by the interior decorations, I would prefer to comment briefly on a few points that would mean happier ownership and operation to me. Adequate heating of any or all parts of the roomy cabin without stifling the pilot has always plagued me in cold weather or at altitude.

Beech solves this in the "J" by feeding the rear seat by the same control that warms and defrosts the windshield and giving the two front seats separate controls. Separate gauges for the left and right fuel tanks were a change but more impressive to me was the fact that the familiar center grouping of gauges can all be removed for service from the panel by unfastening four screws, eliminating a most annoying maintenance headache of the past.

Gene showed me the new vernier-style mixture control which operated exactly like the throttle it most resembles, although its location at the bottom of the quadrant should eliminate any confusion, and the one extra, very eye-catching fuel pressure gauge. He laughed when I instinctively reached for the wobble pump—he had just shown me the two-position electric boost pump switch.

The "J" started easily with the fuel pressure at about 2 psi on the low position. As the engine pump took over, I cut out the boost pump and we taxied out. Dragging through the "puddle," I was a little hesitant about the crosswind takeoff

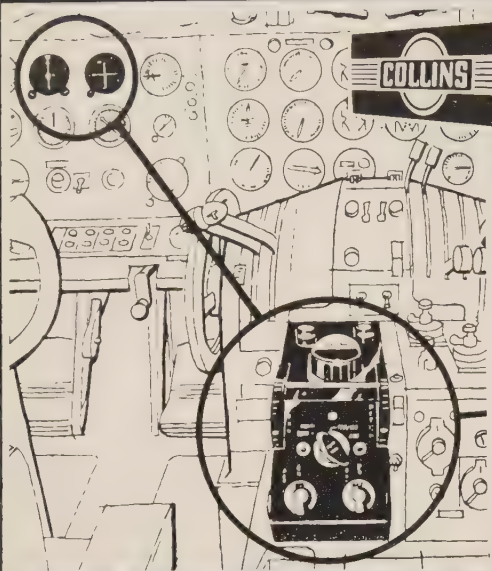
(Continued on page 35)

HANGAR No. 2

BAYAIRE
AVIONICS
INCORPORATED

20 minutes to Downtown
San Francisco

OAKLAND AIRPORT, OAKLAND, CAL.



COLLINS

MEMO:

4 points of interest for
the Air Minded Executive

- The installation of Collins Integrated Flight System with Auto-pilot is nothing new to us.
- Saves flight time by precise navigation.
- Integration of flight instruments increases safety factor.
- Well qualified to install both pictorial presentation instruments and floor-mounted Auto-pilot unit.

Service • Sales • Installation

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• NAVIGATION

• CONTROL

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Service for

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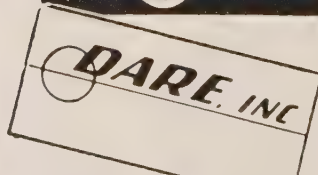
NARCO

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and others

Distributor for



By Russ Brinkley, Pres.

Inquiries arrive daily asking the whereabouts of some veteran airman.

No one has been subject of wide search than Cloyd Clevenger. He turned up at the Miami, Fla., anniversary to join the club and let us know that he is in the skywriting business in Mexico. Another famous airman, who once thrilled millions as wing-walker and stunt man for Gates Flying Circus, is flying in electronics test work with Bendix at Teterboro. He is Duke Krantz, who, in the air show era, was known as the Great Diavalo.

Dr. J. E. Owens, flying dentist, about 1930 well known to air race fans, has been located, just where he resided 3 years ago, at Asheville, N.C. Val Dagosta, a staunch Navy man, is President of Jack Duelks, just as staunch for the Marines, is Secretary, Nevada Wing.

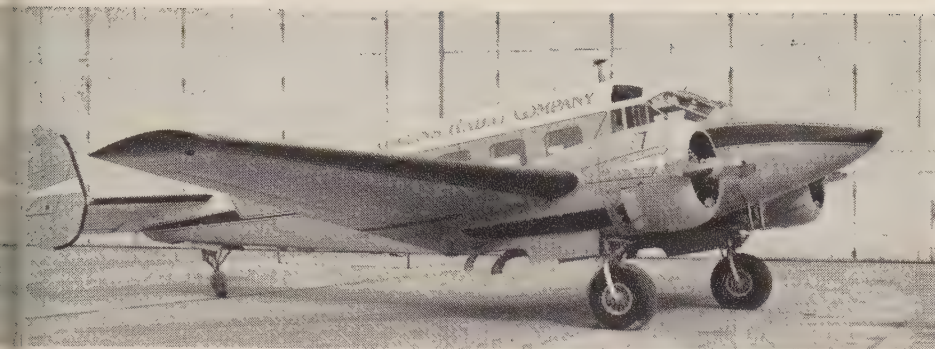
Burrell Tibbs, despite many filled log books, still sits up front and tells students how at Down Town Airpark, Oke City. Meantime, Bill Coleman holds record for staying longer than any previous manager at Oke City Muni.

Harry Sievers, who flew mail in Oke Waco's, Pittsburgh-Cleveland, in 1927, has been stranded in Cleveland since. His surviving fellow mail pilot, Merle Moltrup, after flying for three airlines, still bounces small planes at Beaver Falls, Pa.

Charles Planck thrilled Cincinnati newspaper readers with his air yams and occasionally did a parachute jump at Lunken Airport in 1927. Nowadays he holds down a desk behind a typewriter, at CAA. Art Davis, Lansing, Mich., has never given up the idea that he can make a living performing at air shows. Had a big year in 1957 and saw outlook for this summer, even brighter. Art still flies the same Waco Taperwing with which he has earned a fortune.

Ted Abrams still engaged in high altitude aerial survey pursuits, postponing round-the-world trip, to attend Michigan Wing anniversary. Maj. Gen. D. T. Spivey, retired from Air Force, is either enrolled as a cadet or in some responsible position at Culver Military Academy in Indiana.

Only member in England is Charles Brower of London. His application came about the same time Bill Hollow signed on from Honolulu and Elmer Faucett, Roy Shannon, Frank Sage and L. J. Tippet returned applications from Lima, Peru. Most distant member, George Bruce, Auckland, New Zealand.



COLLINS INTEGRATED FLIGHT SYSTEM MID AUTO PILOT

By Lesley Forden

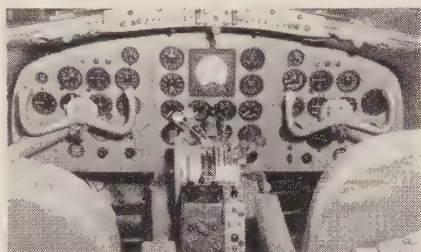
Working an ILS approach in a Collins-equipped Twin Beech will only disturb the old time helmet-goggles pilot—The Collins system is closer to reality the cartoon of a future airliner; its flight deck, entirely automatic, with the pilots con- behind a glass door placarded, Emergency Break Glass."

ough courtesy of Wes Fielding of the Avionics, Collins' Bay Area I flew the Collins Beech Super 44-Mike during its recent visit to and, Calif., International Airport. "Chuck" Pfeiffer, of Collins' Burlingame branch, and Clayton Lander, fac- pilot from Cedar Rapids, were demonstrating to Collins' West Coast that the Integrated Flight Sys- with Auto Pilot can be just as use- as a light twin, as in heavier equip- From the standpoint of pilot safety and safety, it is obviously valuable, since the lighter air- often carries only one pilot.

With my background as a single- engine occasional-IFR pilot, the ques- and answer period with Pfeiffer unusually complete. His explana- varied from technical aspects of the instrument of maximum bank angle in the Steering Computer to degrees off- represented by the dots in the Course Indicator.

Pfeiffer calls the Integrated Flight System the "brains" of the airplane. The AP-101 Auto Pilot its "mus- cles." The Auto Pilot takes over where the pilot leaves off, relieving the pilot of the throttle and monitor the engine.

The IFS eliminated five panel in- struments and consolidated the in- formation in two instruments: the



Approach Horizon and the Course Indicator. Auto Pilot installation adds a third cockpit component, the Flight Controller, completing the office set-up with a minimum of gadgets. Pfeiffer agrees that any electronics system requires certain maintenance, but he points out that Collins has simplified the whole thing to the greatest possible extent. No approach or beam coupler additions are necessary and no tubes are used; only transistors and magnetic amplifiers.

"Clay" Lander, a one time B29 instructor pilot, simulated an instrument takeoff, then switched on the AP-101 and sat back as 46-Mike banked easily in a climbing turn to the heading he set on the Course Indicator.

Upstairs, we twirled the Heading Knob and watched the Beech swing its nose obediently to any desired course. The Steering Computer compensated for cross wind when used in "Nav-Loc" or Approach mode; the Altitude Hold trimmed the plane for altitude desired.

Accustomed to older systems where anything can happen when an Auto Pilot is disengaged after a long period, I was surprised by the ease with which manual flying was resumed with the AP-101 switched off. The Collins auto pilot really supervises those trim tabs!

We simulated several approaches to San Francisco International Airport. Pfeiffer had showed me how the Course Indicator sets up a complete "pictorial presentation." After the first procedure turn and intercept of the inbound course, it really made sense. The miniature airplane etched on the glass face of the instrument is always "you," and it's always where it should be in rela-

tion to the heading. The Course Bar sits there big as life, representing a railroad track, or a radial, or in this case, SFO runway 28-Right. The "To-From" arrow is completely honest, and the whole instrument boils down to elementary wind triangle stuff that any pilot can understand.

The Auto Pilot control is a small unit, pedestal or floor mounted. It has the usual On-Off switches and controls. The four positions of the selector switch are self-explanatory: In "Gyro" position it provides for straight and level or maneuvering with turn knob; in the "Heading" position the heading marker points the airplane like a well trained bird dog; and in "Nav/Loc" position it receives command information from the VOR or Localizer receivers.

"Approach" position is used on interception of the glideslope. At this point the pilot has only to adjust throttles for descent. The AP-101 takes the ship down the glidepath to the threshold. The pilot's job of "monitoring" the approach is simple—as Pfeiffer points out, he "watches" information being fed from IFS Auto Pilot.

The system is installed in many types of aircraft ranging from 4-engine airliners to Aero Commanders to late military aircraft. Its use is increasing in business aircraft, and Pfeiffer is enthusiastic at the interest displayed during the tour. He is particularly impressed with the optimism he finds among people in the business flying field, as contrasted with the general gloom in other divisions of the industry. After a close look at these Collins products, Pfeiffer's enthusiasm is understandable.



New Air Space Policy A Challenge To All Business Aviation

Remarks made by CAA Administrator James T. Pyle, at the Third Annual Jet Age Conference held in Washington, D. C., vitally affect all who own and operate business aircraft.

The speech clearly indicates that:

1. The CAA will no longer be the advocate of civil interest.

2. Under the new procedures that representatives of industry will be expected to state their own positions and justify them where necessary.

3. The CAA Chairman will refrain from urging any particular position.

4. These procedures will be in effect in all regional airspace sub-committees and the Washington airspace panel.

Whenever possible NBAA representatives will attend airspace sub-committee regional meetings where there are matters of interest affecting business aircraft operations.

Excerpts from Pyle's talk:

"The problem of efficient utilization of airspace has been growing more acute for several years. This once vast but now shrinking national resource has become steadily more scarce.

"Where the control of civil and military air traffic must be carefully coordinated, previously planned flight operations can be seriously disrupted by a sudden notice of noncompliance with air traffic rules given by the military. The military have a legitimate and important interest in carrying out their training and operational missions.

"The CAB has published some new rules to become effective April 1. . . .

"The new regulation will require the conduct of most military operations (such as training activities) under a waiver of CAR. . . . The amended regulation will permit necessary military operation in the immediate national defense by a notice to the administrator of non-compliance, but requires prior approval and a waiver with respect to most other operations.

"Another phase of the recent change of the Air Traffic Rules by the CAB is a delegation to the CAA of broader authority to handle the problem of restricted areas. . . . Requires the designation of restricted areas in accordance with the standards of the administrative procedure act which means that we must hear from all segments of airspace users before determinations can be made as to the use of the airspace involved in any particular proposal. . . . While we are going to continue to use the airspace organization of the air coordinating committee in getting the views of airspace users, our designation of these areas will no longer be predicated upon unanimity of opinion within the ACC but will be based upon an objective analysis of the interests of the respective airspace users and especially the public interest.

"The ACC cannot take affirmative action on proposals without unanimous approval of its members. . . . In many instances compromises which had to be made to reach unanimous agreement were not in the public interest.

"The Board's recent action is an attempt more particularly to specify its intention in delegating authority to the CAA to designate, modify or revoke restricted areas. The Board is retaining in itself the right to review on its own initiative the CAA's action in designating restricted areas. Otherwise, our decisions are final.

"We hope that we will be able to coordinate the establishment of military installations with new airways. . . .

"Another of our efforts is the modernization of our airways system insofar as it relates to the establishment and improvement of communications and air traffic control facilities.

"The effects of the Federal Airway Plan will soon make itself felt. Long range radar, surveillance radar, peripheral communications equipment, VORTAC equipment, high speed teletypewriters, microwave links, and other equipment are coming off the lines and are being installed along the airways. . . . With the implementation of the plan the CAA will have the potential to control air traffic so precisely that airspace reservations will not pose the great problems they do at the present time.

"At the same time the Airways Modernization Board is studying procedures and equipment by the use of which it is expected we will gain greater efficiency out of the limited airspace—especially in the vicinity of large terminal areas, such as New York, Chicago, Washington, and Los Angeles.

" . . . Airspace problems were presented through and coordinated in the airspace components of the Air Coordinating Committee. *THIS DID NOT ALWAYS RESULT IN INDUSTRY BEING ADEQUATELY REPRESENTED BECAUSE ITS VIEWS IN MOST INSTANCES WERE PRESENTED BY CAA AND SOMETIMES NOT WITH THE VIGOR AND ENTHUSIASM THAT INDUSTRY WOULD HAVE LIKED. UNDER OUR NEW PROCEDURE, AVIATION INTERESTS WILL BE AFFORDED AN OPPORTUNITY TO PRESENT AND JUSTIFY THEIR OWN VIEWS ON THEIR OWN MERITS AND ON AN EQUAL FOOTING WITH ALL OTHER USERS ON EACH PROBLEM INVOLVING SPECIAL USE OF THE AIRSPACE. CAA WILL NO LONGER BE THE ADVOCATE OF CIVIL INTERESTS SOLELY BY VIRTUE OF THE FACT THAT THEY ARE CIVIL INTERESTS AS OPPOSED TO MILITARY.*

"Determinations will no longer be made in the Air Coordinating Commit-

tee on the basis of unanimous agreement. The decisions from April 1 on will be based upon an objective analysis of all positions and the reasons therefor and arrived at only after each user of the airspace has had an opportunity to present his views.

"HERETOFORE, AS I STATE PREVIOUSLY, THE CAA HAS GENERALLY REPRESENTED CIVIL INTERESTS IN AIRSPACE MATTER UNDER OUR NEW PROCEDURE REPRESENTATIVES OF INDUSTRY WILL BE EXPECTED TO STATE THEIR OWN POSITIONS AND JUSTIFY THEM WHERE NECESSARY AND THE CAA CHAIRMAN WILL REFRAIN FROM URGING ANY PARTICULAR POSITION. THE GOVERNMENT REPRESENTATIVES ON THE REGIONAL COMMITTEE WILL BE EXPECTED TO STATE THEIR POSITIONS AND JUSTIFY THEM IN THE SAME MANNER AS DOES INDUSTRY.

"The CAA will have an agency position with respect to the proposal under consideration. This position will be based upon safety matters arising out of the control of air traffic or the conduct of flight operations by civil or military aircraft or it may revolve around the design or use of a civil airport. Administrative and fiscal problems of CAA will also be a factor in the Agency's position. . . .

"Following presentation of position of interested parties, the committee will be closed to public participation; classified information in support of a position urged by a Government Agency will be presented to the Committee. The Committee chairman will then prepare a report to Airspace Panel, Washington—positions of each agency will be stated.

"If it appears that the positions of the different government agencies and industry cannot be reconciled by agreement at the Washington level, the administrator will make a tentative decision. . . . He will then issue a public notice of proposed rule-making, setting a time and place at which he will hear any interested party on the question of adopting his proposed rule. . . . The CAA will furnish the Chairman, who will conduct the hearing, receive all material submitted for consideration and recommend to the administrator the final action to be taken on the proposed rule. At the conclusion of the open hearing the Administrator will receive classified information."

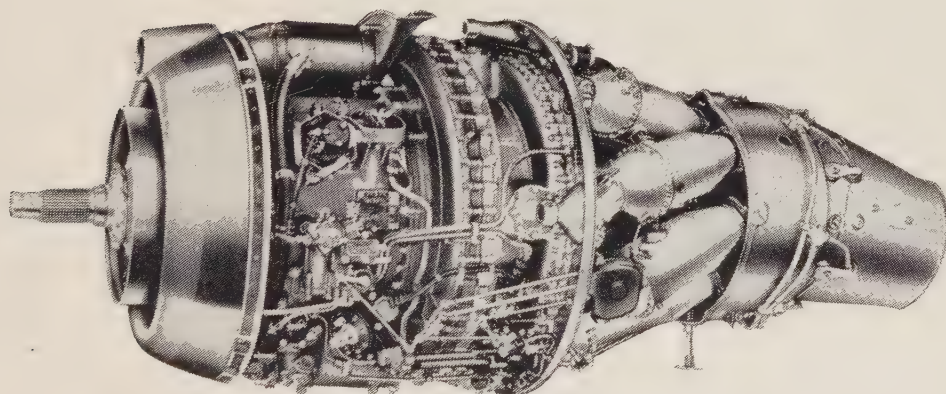
"Efficient utilization of the airspace requires periodic reviews of all federally designated airspace areas such as civil airways and restricted areas. . . . Air Traffic Supervisors will have the planning, utilization, and monitoring of airspace as primary responsibilities. They will act as liaison between the CAA and the users of the airspace.

"We want a continuing review made as to whether airways and restricted areas already established continue to be needed. . . . if changed circumstances will permit their readjustment to permit less interference with other airspace users."



ROLLS-ROYCE DART PROP-JETS

POWER THE VICKERS VISCOUNT, THE FAIRCHILD F-27 AND
THE AVIATION TRADERS ACCOUNTANT AND HAVE BEEN CHOSEN
FOR THE ARMSTRONG WHITWORTH 650 FREIGHTERCOACH
THE HANDLEY PAGE HERALD AND
THE GRUMMAN GULFSTREAM



*For airline, local service carrier
and executive operation, the Rolls-Royce Dart is
the most proven prop-jet in the world.
It has flown over 4,000,000 hours in
scheduled airline service.*

ROLLS-ROYCE LIMITED, DERBY, ENGLAND.

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NAVICOM



AIRBORNE TV's 5-in. screen of closed-circuit set shows pilot exact location in relation to ground. Sam Ramano, Avion engineer, holds "unit map" insert on which area size of United States can be shown in detail on single 4-x-5-in. glass plate. Computer signals govern position of map and plane image in relation to each. Resultant picture is picked up by TV camera and transmitted, magnified, to screen.

Cockpit TV Shows Aircraft Position

An airborne closed-circuit television device that pictures constantly for the pilot his exact location in relation to the ground has been developed by Avion of ACF Industries, Inc.

Called the "Horizontal Situation Display," it automatically correlates information fed into it by navigational computers and instruments, and presents a TV picture in the form of a map of the terrain below the plane. An aircraft image, projected over the map, always corresponds to the pilot's exact position over the terrain.

R. F. Wehrlin, president of Avion, explained that "while navigational computers have taken over the complex

job of determining a plane's true course, speed and position, the pilot still has to take the numerical data supplied by the computers and put it on a map before he can determine exactly where he is. This involves manual selection, unfolding and folding of large maps and the use of loose instruments, such as pocket computers."

The HSD relieves the pilot of that taxing chore. On a 5-in. (4 in. usable face diameter) round TV screen mounted on the instrument panel, it shows an image of his plane superimposed over an aeronautical chart. This permits the pilot to have before him a continuous and automatic pictorial presentation of geographical position and track which eliminates the need for

bulky charts and hand computers.

The HSD operates in this fashion: Signals from a navigation computer are fed into it. (With modification, it can utilize VOR, VOR-TAC or TACAN.) These in turn actuate controls governing the position of the map and plane image in relation to each other. The result is picked up by the TV camera located in a remote part of the plane and transmitted to the cathode ray tube in the cockpit where it can be viewed by the pilot.

One of the outstanding advantages is the "unit map" concept, where a map of the entire United States can be reproduced in detail on a single glass plate measuring only 3 x 4 inches. When viewed by the pilot, only enlarged portions appear on the cockpit screen.

Aeronautical maps of any areas of the world can be microfilmed on glass and used as needed. In addition, the system is equipped with multiple-lens turrets to provide two magnifications. Thus, by the flip of a switch, the pilot can view a detailed area of approximately 40 miles in diameter (Ed. note: 10 miles to inch, or close to Sectional map scale.) or a larger area of 120 miles (similar to the scale of the Air Force Jet Navigation Charts.)

The HSD is completely automatic. It is only necessary to make preliminary settings when a new chart is inserted in the remote plotter unit, and this is done before takeoff. The pilot energizes the equipment through a power switch, then operates the slew control to position either the map or the marker at the takeoff point. Once the map is in place and initial latitude and longitude information is included, the plotter requires no further setting.

In addition, the pilot has other controls which may be used to make either map or plane image move, to reposition either, select either of two magnifications and to control brightness and contrast of the picture tube. He has also a display orientation selector which gives two alternatives in the view of the map and marker. In one, the map is in a position where north is upright, and the image rotates to show the plane's heading; in the other, the plane image is upright and the map is rotated so that the plane image is coincident with the axis of the actual aircraft, and the pilot sees the map as he would see the ground if visual.

The heart of the equipment, the plotter and electronic units, are contained in two remotely located packages, each about one ATR. Together with the TV tube, the total weight is less than 45 pounds.

With the Avion system, it is possible to track either by motion of the plane image or the map. Normally, pilots prefer the latter, giving the impression of realistic visual flight.

Should the pilot desire to trace a desired flight path on the face of the

en and "fly the line" with the plane
ge, he flips a selector switch. The
ge will then appear to be moving in
tion to the map. As the image ap-
proaches the edge of the screen, track-
is automatically transferred to the
motion, preventing the plane image
in "flying off the map."

Wehrlin advises the HSD is sufficiently
patible to be adapted for many flight
operational purposes. He said that
necessary to fly irregular or deviating
ourses, the desired flight path can be
ed on the face of the screen for the
ot to follow. Rescue or search mis-
siles can be simplified by laying a
ed over the screen face.

he same general method could be
ed for ground traffic control of the
e, by transmitting a radar or other
sure from the ground to the plane's
omputer.

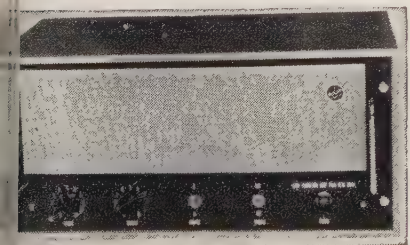
It is even possible to combine air-
ne radar with the HSD. This could
done with a two-gun cathode ray
e; one gun would be used to project
HSD map and image on the screen,
other would project the radar scan.
lar and chart information could be
played *simultaneously* or individu-
al, as desired.

HF Communications For LR To Ground Company Services

a new ground station radio receiver
reception of aeronautical HF com-
munications on one or two channels be-
tween 1600 and 8000 K.C. has just been
roduced by Kaar Engineering Corpo-
on of Palo Alto, Cal.

uitable for remote area long range
mmercial company air-to-ground 2-
y communications, the Kaar 117R244
eiver is available in both a single-
nnel and a dual-channel version,
mplete in a metal cabinet or less
innet for mounting in a standard 19"
ay rack. The single-channel model
mplies 8 tubes plus rectifier; the dual-
nnel model uses one additional tube.
e receiver is designed for operation
m 117 volts AC in ambient tempera-
es from -30°C to +60°C with
ididity up to 95%.

The single channel model for rack
mounting sells for \$196 and with
cabinet for \$226, both price f.o.b. Palo,
o.



CC Deviation Found Crash Cause

The crash of a TWA Airliner into
India Mountain near Albuquerque,
w Mex., in February was caused,
clair Safety Advisory reports, by
k of conformity with prescribed en-
ate procedures and deviation from
ways at an altitude too low to clear

obstructions. The flight was dispatched
properly and the crew had latest
weather data prior to departure. The
flight did not follow instructions con-
tained in its ATC clearance. The flight
collided with a cloud-shrouded moun-
tain while flying an off-airways course.
This is in accordance with the Acci-
dent Investigation Report of the CAB.

Sinclair Supervisory Pilots have com-
mented that "all our pilots are using
RF and Jeppesen Charts on all flights.
Maps are carried, but sometimes, be-
cause of seeming familiarity, are not
used. Had the pilot and copilot checked
their heading on a map it would have
been apparent the mountain would be
on their path and the aforementioned
accident would not have happened.
Anytime a pilot leaves the airway, a
topographical chart should be checked.

New Radar Expands Weather Evaluation

Bendix Aviation Corporation's radio
division has come up with a simple idea
which can do more to expand and im-
prove weather forecasting than some
of the multi-million dollar programs at
hand.

Their proposal is a simple conversion
of their already proven RDR-1 air-
borne weather radar system to ground

station use, a relatively simple and in-
expensive repackaging. Only changes
in basic equipment are the substitution
of a 12-inch radar indicator console in
lieu of the familiar airborne 5-inch
cockpit indicator and separate control
panel and the addition of a converter
unit to convert standard ground 60 cycle
power to the 400 cycles required by the
radar, plus a special plastic radome to
house the antenna and equipment.

The radar can be set up for C-band
or X-band according to customer pref-
erence and remotely operated up to 200
feet, so that the indicator can be in-
stalled in airport or industrial offices.

Low Visibility Approach Simulator By Doman Offers New "Flight Minimums" Training

An endless belt—TV projection com-
bination is the basis of the Doman
Approach, Landing and Take-Off
(DALTO) simulator. The device offers
for the first time flight training under
simulated visual conditions of less than
a 300-foot ceiling and a half-mile visi-
bility during night or day fog or heavy
rain.

Developed by engineers of Doman
Helicopters, Inc., Danbury, Conn., the
DALTO is designed as an attachment

Flashing Lights Identify Runway Threshold For Landing Planes



Sylvania Electric Products Inc. has
been awarded a CAA contract for 25
sets of brilliant, flashing airport "run-
way identification" lights to assist in
locating a runway during low-visibility
approaches.

Each set consists of two strobeacon
light units flanking the end of the run-
way. The gas-filled, condenser-discharge
strobeacons emit simultaneous light
bursts reaching a peak of 30 million
candlepower that identify airport run-
ways *not* equipped with hi-intensity
lighting systems in the approach area.

The flashing lights are visible slightly
above the bottom rim of the cockpit

windshield (see photo) of an airplane
landing at Chicago's Midway Airport,
one of the 15 civil and military air-
ports where the runway identification
lights already are operating. Additional
units are either being installed or on
order at ten other airports.

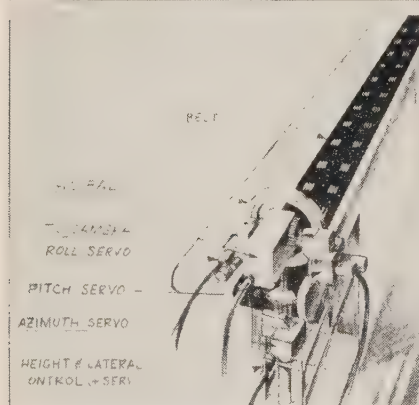
The CAA said the reference lights
would be installed at 25 more airports
to be determined at a later date. Each
set will be accompanied by timing
equipment that automatically controls
the simultaneous flashes from the two
strobeacons, and a monitoring system
for installation in the airport control
tower.



to existing trainers to create a visual pattern of approach and runway lights as seen by the pilot during the approach and landing on a runway under conditions of extremely low visibility and cloud ceilings. Simulated takeoffs can be made, also, with the transfer from visual flight to instruments.

Interest shown by major airlines indicates a multi-million dollar market for the simulator, according to Doman. Because the device can be set to "fly" as any plane, the DALTO has a potential market in the business aircraft field. However, the approximate price of \$40,000 may limit purchase of the simulator to the larger corporations which operate their own training departments and to flight training businesses. The latter, of course, would make the simulator available to its business aviation customers.

Under the supervision of Ward D. Davis, manager, Flight Simulation Div.,



the Doman simulator's concept is to display only the minimum necessary visual cues for orienting the pilot during the visual portion of an instrument approach and landing.

Production model of the DALTO will be 4½ ft x 4½ ft x 11 ft in size. The unit contains General Precision Laboratory's five-pound vidicon TV camera, its associated hardware for positioning the camera, the endless belt which portrays the approach lights and runway and the apparatus which varies the restriction of the cloud ceiling and visibility. It is operated by one person and can be remotely by as much as 300 feet for space convenience.

The GPL projection TV system

throws four times the light of any other projector on today's market, the manufacturer claims. In the form of a barrel approximately 18 inches long with a 16-inch diameter, it can be mounted on the side or top of the simulator.

The Doman device shows 3,000 ft. of approach and tracer lights and 10,500 ft. of runway with a maximum of a half-mile visibility. Configuration of lights for both approach and runway are optional. Additional approach and runway belts which represent other lighting configurations may be installed as desired to increase the realism for a particular airport.

At the initial press showing, the device was depicted in a film with a "DC-3" being "flown."

If the simulator is aimed at only ten percent of the potential market, Doman claims this would mean sales ranging from \$4,000,000 to \$6,000,000.

Two New Fields To Serve Business Aircraft In Massachusetts

Applications for two privately owned commercial landing fields have been made to the Massachusetts Aeronautics Commission to serve business aircraft.

Waldemar Hagberg wishes to estab-

lish a single runway at Wilbraham Airport to serve the business aircraft needs of the Springfield area. According to Richard P. Bank, aeronautical inspector of the Commission, the site is well chosen for ground travel accessibility and lack of houses in the area. Present plans are for a 3,000-foot paved strip with hangars and servicing facilities.

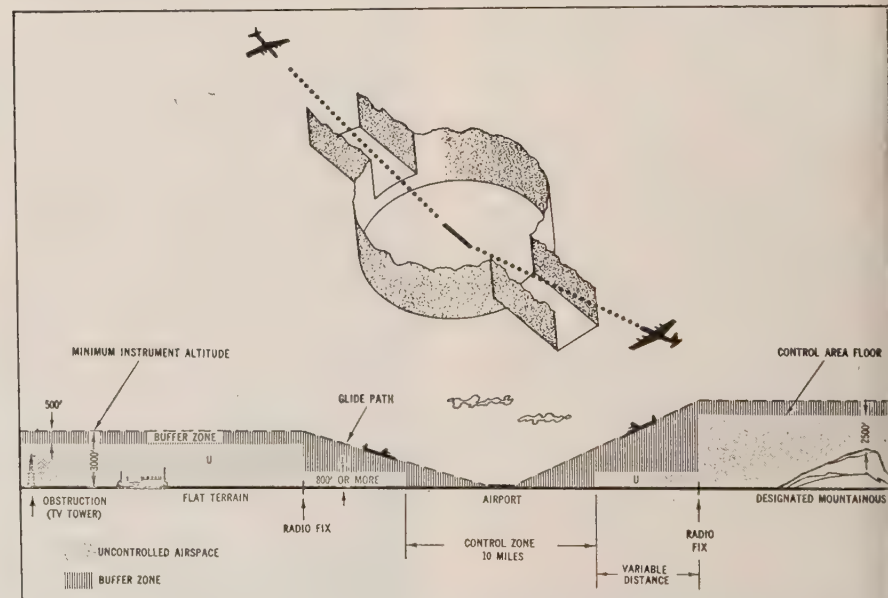
At Middleboro a private strip site has had a commercial application made to the Commission by Chester W. Lewis. The field will serve the Bridgewater-Middleborough area for small business aircraft use plus light pleasure plane operation. It is a sod field with no plans at present for surfacing.

Both sites have been approved by the Commission's inspection section. Certain final preparations by the applicants must be completed before licensing can be accomplished.

We Goofed!

In the last issue we reported a VHF transceiver for use as a standby communication unit. We omitted that it is the first unit of a new "Topp-Flyte" line of aircraft nav, comm and flight control equipment to be marketed by Topp Mfg. Co., Los Angeles, Calif.

How GAFPG Plan To Raise Floor Of Controlled Airspace Would Work



This composite drawing demonstrates the Air Navigation Rule changes proposed by the General Aviation Facilities Planning Group to raise the present 700-foot control area floor to no less than 2,500 feet. Depicted is "flat terrain" (left of control zone) where present rules require adding 1,000 feet to height of highest obstruction on airways to determine minimum instrument altitude; in "designated mountainous terrain," (right) 2,000 feet must be added. The GAFPG plan would utilize these minimum instrument altitudes to determine the control area floor. However, this "floor" would never be less than 2,500 feet above the immediate terrain and the

minimum instrument altitude would be 3,000 feet.

A 500-foot buffer zone—the difference between minimum instrument altitude and control area floor—would separate instrument flights from uncontrolled flights (labelled "U" on chart). Airport control zone (in center of chart) would be limited to a five-mile radius with corridor-like extensions to the radio "fix" to enable instrument flights to climb-out or let-down in the control zone. The glide path (dotted line) indicates the normal line of descent of an aircraft making an instrument approach to the airport in such a corridor. Corridors will have at least 800 ft. free airspace beneath them. EN

Caribbean And Latin American Business Aircraft Flight Service

Information is offered by the NBAA to assist persons planning flights in the Caribbean area. Comments from persons using Dispatch Services, Inc., facilities report satisfactory services. Dispatch Service, Inc., is at Miami International Airport, Fla. Services offered are:

1. Securing all landing permits;
2. Provision of papers and all other necessary documents for each country itinerary;
3. Clearance of Customs from Miami, including exportation papers, if necessary;
4. Provision of flight plan and weather information;
5. Sale of charts and navigational equipment;
6. Rental of life rafts, Mae Wests, and other emergency equipment;
7. Sale of Aircraft gasoline and oils;
8. Arrange for catering, hotel reservations, etc;
9. General briefing on the complete itinerary.

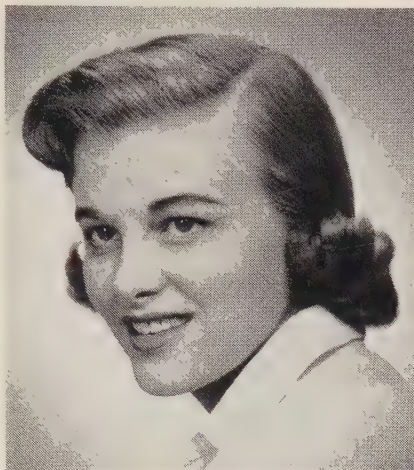
Charges for business or private aircraft range from \$20 for one to 20 passengers and two crew, to \$25 for 25-50 passengers and two crew, on a one-stop roundtrip flight from Miami. Additional stops are charged \$5 in and out, each.

Clearance includes general declarations, passenger baggage declarations,

landing carus, filing of flight plan and passenger manifest. It does not include cargo manifest, landing fees, customs overtime, phone calls, telegrams, etc.

Rental of emergency equipment, ramp service and other cost information is available from Dispatch Services.

Now Is The Time For NBAA Members To Submit Miss Business Aviation 1958 Candidates To Reign At Philadelphia Convention, September 22-25



MONA GEORGE
Flight Safety, Inc., Ft. Worth, Tex.



PAT WALKER
Delta Drilling Co., Pampa, Tex.

NBAA and Skyways thought it time to remind members of the Association that it's that time of year again. It's time to pick your prettiest (and she must be single) employee and submit your nomination to NBAA Headquarters, 344 Pennsylvania Bldg., Washing-

ton 4, D.C., August 1 is the deadline.

Remember these pretty gals? Mona George has the title of Miss Business Aviation 1957 . . . and holds it until she relinquishes the name to this year's winner as Pat Walker did last year. Pat was Miss Business Aviation 1956.



NAS- NO. 1 LOCATION for Manhattan-Bound FLIGHT EXECUTIVES! Just 20 Minutes From N.Y.C.

Around the clock, Newark Air Service offers the resident or in-transit business pilot and executive passenger . . . a complete, dependable and efficient terminal, storage, maintenance and refueling service, with enthusiasm!

Whether an executive's conference room is needed, or a part, a quick cup of coffee or an engine maintenance job, we serve you with an experienced touch and a dash of "northern" hospitality. You'll find too . . . all the super services that Newark Airport commands, right at your fingertips. For Manhattan-bound business flyers, we think we're a "natural". Try us! You'll be pleasantly surprised.

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One in a series on how business aircraft are kept in top flight condition — and why these fleets, like the major airlines, prefer

CHAMPION SPARK PLUGS

Noted aviation authority reports on OHIO OIL'S



Herbert O. Fisher

Winged Couriers of Industry

by HERB FISHER, international aviation authority, veteran test pilot, author

Backbone of civil aviation's growth to 100,000 aircraft — a 400 per cent increase in 15 years — is "strictly business... business before pleasure."

Of civil aviation's *private* flying fleet alone, which is 44 times larger than the 1,500-plane scheduled airline fleet, some 25,000 aircraft are "flying conference rooms," *winged couriers of industry*.



Down to earth... Mike Murphy, Co-pilot Dick Owens (l/r) chart route to Guatemala.

Business flying is big business, expanding at a rate far outstripping that of commercial and pleasure flying. With one factory in three located in a small town off commercial air routes, business fleets are more than paying their way.

I've found few firms with business fleets and aviation departments comparable in size, scope and efficiency

to that of the Ohio Oil Company.

This company — with world-wide operations embracing exploration and production, supply and transportation, refining and marketing — is a natural for business flying. The

14th largest domestic crude oil producer among 12,000 concerns, Ohio Oil must integrate by fast flight a scattered domestic operation ranging from Texas to Canada, and a



Rugged duty... Champion-equipped Tri-Pacer flies Illinois pipeline patrol.

foreign exploration program stretching to remote corners of the earth.

Ohio Oil operates 23 aircraft, has 32 full-time pilots and co-pilots, nine skilled mechanics, and owns and maintains a modern airport at Findlay, Ohio, equipped to handle all types of aircraft; runways alone compare with the longest in the U.S.

Heading the company's 48 member Aviation Department is an old friend of mine from barnstorming days — one Michael Murphy, dean of old-time stunt men, a decorated precision pilot and an aviation legend. Mike set up Ohio Oil's Aviation Department in 1945, after an Air Force career as lieutenant colonel in charge of glider fleets for General "Hap" Arnold.

Few U.S. corporations own and operate an airport with such complete hangar and shop facilities for maintenance, overhaul, and even conversion of its varied aircraft, as does Ohio Oil. And in every detail, this operation is efficiency at its best.

"Management wants nothing but the very finest care given their planes aloft as well as on the ground," Mike told me. "We're directed to use only the very best in parts and equipment — thoroughly tested by us to meet our top standards for maximum safe performance in all operating extremes.

"That's why we've used Champion Spark Plugs, for example, for 10 years. We've found them tops in performance and dependability."

Ohio Oil aircraft, too, are selected for specific jobs — Super Ventur DC-3's and C-47's for long haul to far-flung points not serviced by

Days away, once... Remote oil field is but few hours from Findlay headquarters via Champion-fired Bonanza business craft.



In good hands... Skilled technician assures peak performance of Pratt & Whitney R-98 Super Beech engine with dependable Champion





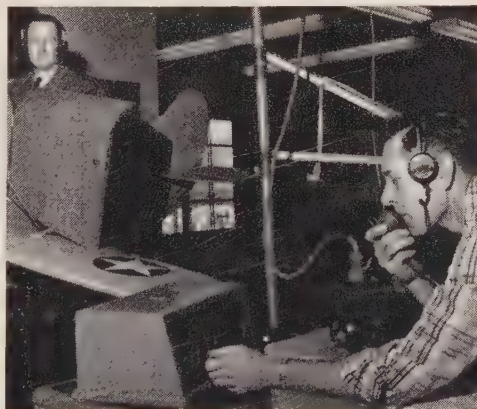
Top men, top assignment, top equipment . . . "Amazing what the right spark plug can do," Mike Murphy (c) tells Ass't Aviation Mgr. Earl Bauer, Ventura Pilot Dick Yoakam (l/r), and Co-pilot-Mechanic Mac Powell (rear). Ohio Oil experimented with other spark plugs through the years, always returned to Champions.

airlines, or for large groups wishing to hold conferences en route; Piper Tri-Pacers for pipeline patrol; Twin Beeches, a Twin Bonanza, a Travelair and Bonanzas for heavier loads and feeder service to airline terminals; DeHavilland Beavers and Cessnas for general duty.

"With our world-wide operation, traveling itself could be a full-time occupation for many of our personnel if we didn't have our own air fleet," Mike said. "Management indicates that, without a business fleet, we would need considerably more high-salaried specialists and executives — and these are hard to come by. It's difficult to estimate the monetary value of increased production hours resulting from tremendously reduced travel hours."

A case in point: For Ohio Oil executives to get in one day's work at the company's Robinson, Ill., refinery, two days are spent in round-trip land travel. Champion-fired business aircraft, however, provide three-hour round-trip commuter service, enabling one man to compress three days in one.

"We're not competing with the



New feathers for old eagles . . . Veteran pilots like Tom McFarland get constant refresher training in new equipment and procedures. Link operator is Pilot Dick Carpenter.

airlines," Mike said. "Actually, we bring them to our front door. We shuttle our executives to commercial terminals when they're en route to destinations served by airlines."

Aerial pipeline patrol certainly pays for itself, too, Mike told me. A Tri-Pacer pilot covers in one day 550 miles of Ohio Oil's 3,300-mile pipeline system. Walking inspectors cover but 10 miles a day.

This daily flying at extremely low altitudes calls for intense pilot con-

centration — split-second attention to various details of plane performance, terrain, turbulence. The pilot can take no chances of engine failure. Such rugged duty makes it mandatory, then, that the vital heart of the pipeline patrol plane be fired to life day after day by Champions.

Ohio Oil maintains small airports in remote exploration areas of South America and Africa. At Ohio Oil's Oasis Oil Co. of Libya, for example, a C-47, Beaver and Cessna carry supplies and personnel into regions previously accessible only by many days of camel caravan.

Here, too, Champions assure safe flight over trackless wilds, where engine trouble far from an airport might mean the end . . .

At Findlay headquarters I saw flight crews — all in white dress shirts — handling passenger baggage,



Fast, flexible . . . Egyptian C-47 and helicopter help solve time, distance problems — mandatory for integrating and supplying Ohio Oil's far-flung foreign operations.

gassing planes, doing administrative work, getting weather reports, mapping precise routes over back country, doing custodial work in plane interiors, checking and ordering replacement parts, performing as all-around mechanics, designing their own executive plane interior equipment, sewing fabric and doing carpentry on interior woodwork installations — literally doing *everything* themselves — plus flying.

"You'd have to screen thousands of pilots and mechanics to find any as qualified as ours," Mike told me. "Our men must be specialists in not one field but several."

It's a real tribute to Mike's management and experience — along with the performance of pilots, maintenance crews and aircraft equipment, such as Champions — for Ohio Oil to have been honored by the N.B.A.A. for a perfect safety record . . . 33,000,000 accident-free passenger miles.

CHAMPION SPARK PLUG CO.
TOLEDO 1, OHIO

Helicopters for Business



Firm Adds Air Dimension to Sales

Pioneer producer of trucks, earth-bound vehicles, is Diamond T. Motor Car Co. which is now striking out in another pioneer field of truck merchandising by helicopter.

The Chicago, Ill., firm has found that their "magic carpet" enables Diamond T executives and visitors to put to use many hours usually wasted in traffic-snarled land travel.

With a heliport at the rear of the factory, Midway Airport is less than five minutes distance and O'Hare Field is only ten "eggbeater" minutes away. This is in positive contrast to the 20 to 60 minutes these trips usually require by ground vehicle.

Another major advantage of the helicopter is the speed with which emergency shipments of replacement parts can be delivered to airports for reshipment by commercial airliner. A few minutes can mean the difference in catching or missing a plane and saving trucker hours of "down time."



The firm's sales division has discovered that the whirlybird is a helpful tool in building additional volume. The sales executive is able to get to the right spot at the right time to meet appointments, even in widely separated city points of the Chicago area.

Looking at it from the other end, important truck fleet operators and executives are now able to visit the Diamond T plant and return to their offices without consuming too big a bit from the normal working day.

During the American Trucking Assn. convention in Chicago, Diamond T kept two 'copters busy shuttling dis-

tinguished visitors to and from the factory. Flights were from lake-front Meigs Field near the convention headquarters. The rides were commemorated by engraved "Eggbeater Club" membership cards signed by Z.C.R. Hansen, company president.

Earth and air transportation, complement each other in this business.

Chance Vought Buys 'Copter

A Sikorsky S-58 helicopter has been purchased by Chance Vought Aircraft, Dallas, Tex., to be used in support of the company's flight program.

In addition to personnel transport and high priority cargo, the helicopter will be available for disaster or rescue missions in the Dallas-Fort Worth area. The cabin is equipped with upholstered seats for 11 passengers.

CV pilot Ernest Shireman flew the plane to Texas with John Lambert, crew chief. Shireman is an ex-Marine pilot formerly in helicopter operations with oil companies in the Gulf of Mexico.

English Firm's First Turbine-Powered Multi-Engine Helicopter Ground Test Rig In Operation

Bristol Aircraft's first turbine-powered helicopter ground rig, twin-engine tandem rotor configuration, has begun preliminary running tests at the company's helicopter center at Weston-super-Mare, England.

The rig, powered by two Napier Gazelle free turbine engines of 1,650 shp each, is the first of two built to develop and test the engines, transmission and rotor head systems for use on production versions of the Bristol Type 192 helicopter. The 192, reported to have excellent single-engine performance, is suitable for use as an executive aircraft as well as for passenger transport, troop and freight transport, ambulance and search and rescue roles.

The test rig, virtually a complete air frame, can simulate gear box, transmission and steady flight loads closely akin to those experienced during actual flight.

Sikorsky Adds New Turbine-Powered Amphibious Helicopter To Line



The first turbine-powered helicopter to be produced by Sikorsky Aircraft is slated for early spring flight tests, according to Lee S. Johnson, general manager.

Designated S-62, the helicopter features components identical to those of the well-known S-55 helicopters. Power plant is a single General Electric T-58 gas turbine. The aircraft offers water landing and takeoff capabilities, increased cabin space and greater payload.

Because the S-62 is designed for

water as well as land operations, emergency flotation gear is not required. Bottom of the fuselage is watertight and strengthened to permit landings on either water or snow. Wheels are partially retractable.

The new model will have unequalled hovering ability at high altitudes, says the firm, with full power available to 17,000 feet. Empty weight is 700 pounds less than the S-55. With the T-58 engine it will have 230 more horsepower for high altitude, hot weather flight.

AMERICAN HELICOPTER SOCIETY FORUM, APRIL 16-19, SHERATON-PARK HOTEL, WASHINGTON, D.C.

Helicopters In Canada

By R. J. Childerhose

The use of helicopters in Canada, since the dawn of the helicopter era in this country eleven years ago, has been predicated chiefly by bush operations. In 1958, civil commercial operators will be using some 130 helicopters. Of this number, the Okanagan Group will be operating 44, 26 Bell 47's and 18 Sikorskys.

Said Carl Agar, Vice Pres. Okanagan Helicopters Ltd., "Bush projects, as in the past and the present, will provide the major demand for helicopters in Canada for some time to come."

At present, helicopter work centres mainly around mining and oil industries, re-supply of radar warning chains, and patrol of pipe and power lines. The forest and fish industries also use helicopters, but not to the extent of the projects mentioned above.

Canada's burgeoning mining industry offers a tremendous field for helicopter expansion, and will continue to do so for many years. This field, which started with initial geological surveys and the moving of a few exploratory diamond drills, has expanded to encompass the actual staking of claims, extensive geological surveys, large diamond drilling projects, electromagnetometer surveys and uranium searching with an airborne scintillometer.

The oil industry is the greatest user of helicopters in Canada, and provides an ever-expanding field running from initial geological to gravity meter and seismic surveys. Already accomplished in the Far East, the moving of drilling-rigs by helicopter is in the offing for Canadian operations.

The government's Department of Transport has been using the helicopter more and more. As well as being utilized for surveys of various kinds, DoT choppers are the "eyes of the Arctic convoy." Mounted on ship-board, they range ahead looking for channels through the Ice-pack, as the government ships move northward on re-supply of Arctic stations. Government-owned Sikorsky S-55's and Vertol H21's are used in the bi-annual re-supply operations of the country's radar warning nets flung across the North. These are the operations that make the helicopter indispensable in Canada.

Says Carl Agar about the future: "Generally, it can be said that the bush operation of helicopters in Canada will provide more business and more profits during the next 10 years than any other type of helicopter use."

Canadian commercial helicopter fleets at end of 1957 included Associated Helicopters, Eastern Provincial Airways, Kenting Helicopters, Laurentide Aviation, Northern Wings Helicopters, Okanagan Helicopters, Ontario Power Commission, Pacific Western Airlines, Spartan Air Services, Vancouver Island Helicopters, Western Helicopters, Wheeler Airlines and World Wide Airways.

Store to Door

Nuts and bolts may be necessary items, but they don't offer much that's unique for sales promotion work. However, one firm came up with a startling approach to this otherwise dull subject.

Briles Manufacturing bought a helicopter and made a coast-to-coast tour with their wares.

The wares in this case included Briles' latest product, the Multitork recess head design bolt used by the aircraft and other industry.

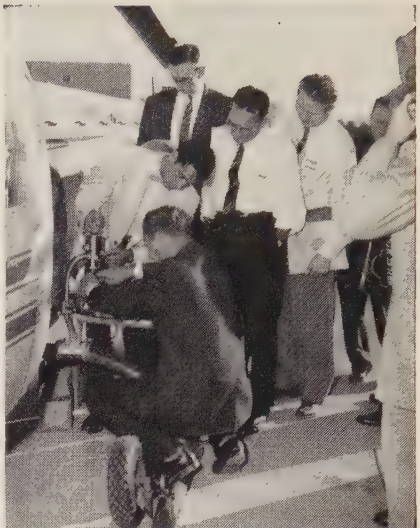
The tour covered 9,000 miles, and the Bell 47J Ranger helicopter flew a route from Los Angeles to San Diego, Calif.; Wichita, Kan.; St Louis, Mo.; Dayton, Columbus and Akron, O.; Buffalo, N.Y.; Bridgeport, Conn.; Long Island, N.Y.; Philadelphia, Pa.; Hagerstown and Baltimore, Md.; Atlanta, Ga.; Dallas and Fort Worth, Tex. Pilot was John Simone.

The helicopter had some special rigging added to the skid gear to convert the craft into a completely self-contained demonstration unit.

Paul Briles, company president, and Max De Zemplen, general sales manager, flew with Simone in the helicopter which was loaded also with sales literature and baggage.

During the month-long flight, the sales team made 28 separate product presentations. Further, the 'copter was kept on schedule whether flying through snow, sleet or fog, or by day or night.

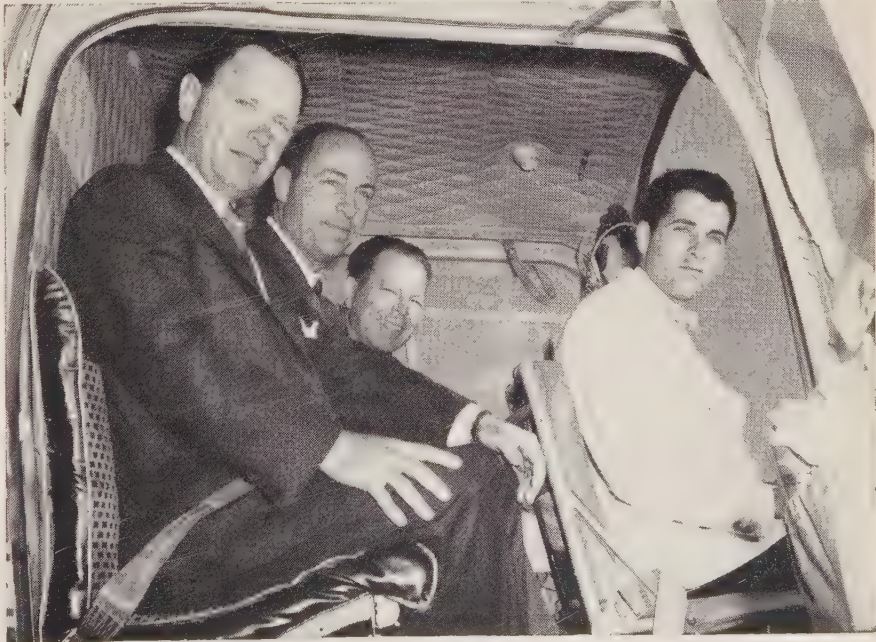
"There's no question that the Bell 47J added prestige to our tour," said De Zemplen. The four-place craft is the same model purchased by the Air Force for the personal transportation of President Eisenhower and his staff.



PRODUCT DEMONSTRATION is conducted by Paul Briles for Bell engineers after landing at Bell Helicopter Corp.'s Texas plant.

Flights in the helicopter were given high level executives after the product demonstrations. Briles said that the opportunity for a 'copter ride lured more than the usual number of executives to the demonstrations. Not only did the unique means of transportation save several weeks of usual travel time, but its ability to land at the customers' doorstep was of immense value, according to De Zemplen.

Briles executives plan to continue using the helicopter for sales promotion work and as a convenient means of transporting executives for calls on customers . . . who receive the unique bonus of a helicopter ride.



OFF TO THE NEXT DEMONSTRATION goes the sales team. From left they are Paul Briles, president; Franklin Briles, vice president; Max De Zemplen, general sales manager; and Briles pilot, John Simone. Demonstration tour covered 9,000 miles in 30 days.

Budgeting Maintenance

by Raoul Castro

Director of Maintenance
Flight Operations
International Harvester Co.

With the rapid growth of executive aviation it is time that something be said about executive aircraft maintenance. Maintenance takes a large share of the aircraft budget, and good maintenance is the key to safety. Therefore, it deserves every consideration.

The secret is to find the proper procedure and the amount of maintenance desired. Too much maintenance is as bad as too little maintenance. In the former case components may become worn from excessive handling and the law of averages regarding human error has more opportunity to demonstrate itself.¹ With too little maintenance, deterioration of the aircraft will result. A happy medium between the two must be found.

Most common method of maintenance is an inspection every 100 hours, the yearly inspection for licensing, and at about 2,000 or 4,000 hours, a large-scale inspection, going over the entire airplane with a fine-tooth comb, also reworking the interior and bringing the radio up-to-date. This method works fine. However, a complete 100-hour takes several days and this cuts down on utilization. Just about the time the boss wants to go somewhere the ship is in for a 100-hour. Outside of taking care of squawks there usually is no maintenance between the 100-hour checks and there is a lack of preventive maintenance. Almost always the cost of this procedure is high because it requires more man hours to perform than the progressive system of inspections.

I have never been fortunate enough to have a sportsman pilot's job where a fellow puts in about 20 hours a month (and that in going to and from Florida or California). My jobs as an executive pilot have always been ones where I have had to put in about 60 to 80 hours a month. Because of this and because executive flying has no semblance of schedule, it is important that some system of maintenance be practiced in order to obtain the most utilization and the best maintenance at a fair price. The most utilization is what the company desires from the airplane; the best maintenance is necessary in the interest of safety; and good management will obtain these at a fair cost. With this in view, about eight years ago I put to work a "PREVENTIVE," "CONTINUOUS" and "PROGRESSIVE" maintenance setup that has worked very well. During this period we have been able to prove it and improve it.

"PREVENTIVE" type maintenance is necessary, not only to anticipate deficiencies before they become dangerous, but also to prevent the recurrence of previous deficiencies. If there is recurrence, a modification should be made to prevent its repetition.

INSPECTION RECORD FORM - 1				
INSPECTION NO.	Engines 1 Insp.	Hyd. System, Gear 2 Insp.	Wings, Tail & Controls 3 Insp.	Fuselage-Interior & Exterior 4 Insp.
Time Due				
Time Comp.				
Time Due: 200 Hr. A Progressive Insp.				
Time Comp.				
Time Due				
Time Comp.				
Time Due: 400 Hr. A-B Progressive Insp.				
Time Comp.				
Time Due				
Time Comp.				
Time Due: 600 Hr. A				
Time Comp.				
Time Due				
Time Comp.				
Time Due: 800 Hr. A-B-C Progressive Insp.				
Time Comp.				
Time Due				
Time Comp.				
Time Due: 1000 Hr. A Progressive Insp.				
Time Comp.				

The "number" inspections will be done every 25 hours consecutively. They will be entered across the page and will correspond with the numbers at the top. The "letter" overhauls are listed in a column on the left margin. As the inspections progress the hours will automatically fall adjacent to a letter and this is the overhaul which is due.

	25 hr. 1 Insp.	50 hr. 2 Insp.	75 hr. 3 Insp.	100 hr. 4 Insp.
Progressive Inspections				
A	1	-	2	-
B	-	-	-	3
C	-	-	-	-
Overhaul	D	1	-	2

"CONTINUOUS" means the ship should be continually inspected starting with the daily which should be performed before each flight and a portion of the 100-hr completed at least every 25 hours until a complete 100-hour is accomplished.

In addition, there should be a short visual "PREVENTIVE" inspection that covers the entire airplane and can be done in conjunction with the 25-hour inspection. These inspections should also take care of radio inverters, dynamotors and equipment normally not attended to until a malfunction occurs.

"PROGRESSIVE" means that as the ship progressively accrues more time the overhaul phase comes into the picture. This overhaul phase can be accomplished at different intervals of time, such as 200, 800, 1,600 hours, etc. When the ship has accrued enough time to complete a cycle then all inspections become due at one time. This entire set of inspections normally takes approximately two weeks. The routine 25-hour inspections take about eight hours and some of the combined inspections need from 24 to 32 hours of working time to complete. It will be noted that when using this system the longest time for which the ship is laid up will be 32 hours with the exception of the two-week complete overhaul.

Accountants like paperwork and figures—for which reason they become accountants. Pilots dislike paperwork and like only figures which are *not* on paper—for which reason they are pilots, not accountants. However, we cannot get completely away from paperwork

and in connection with maintenance there is a certain amount to be done.

The necessary forms have to be made up for this continuous type of maintenance in order to develop the system. Also, the requisite check forms must be compiled for the various inspections. Thus, mechanics at home base or outside can be given instructions to perform the inspections according to the prescribed forms for standardization. It is important that records be kept in order to look back and see what has been done, what needs to be done to correct deficiencies. Result of the reference will reveal ways to improve the maintenance. In addition, an inventory should be kept as a means of recording what components have been removed from the airplane and their disposition. If more than one airplane is operated, it is important to standardize, as much as possible, on the components so that they can be interchanged.

The only objection to the progressive type maintenance as set up by the CAA is the fact that a lot of the shops where some of these inspections might be performed are not rated for the type of airplane which you may be having inspected. However, according to the CAA, the number of certificated shops is increasing every day.

Maintenance can be evaluated by performance. "Performance" is defined as "the execution of the functions required of one" or "effective operation." Both can be obtained from the airplane and from the pilot by good maintenance. END
¹Murphy's Law—If an aircraft part can be installed incorrectly someone will install it that way.

n the business hangar

REMMERT-WERNER, INC., Lamert Field, St. Louis, Mo., installed light-eight landing gear doors, new de-icer boots and tires on Houston Lumber Co.'s Super 92 DC-3. Austin Goodwin, chief pilot, reports 10 mph faster airspeed and gain of 400 fpm climb.

Pillsbury Mills' new R-W DC-3 has Bendix X-band radar with hinged radome, wingaway scanner mount; Sperry A12 autopilot, Sperry C4 gyrosyn compass, Collins 51X2-17L7 880 channel VHF communications, Narco Sapphire 1016 standby HF, dual ARC Type 21 ADF, custom radio and instrument panels, retractable tail wheel, other installations. Jim Grogan is chief pilot.

Storer Broadcasting's Super-92 had double engine change at R-W Pompano Beach, Fla. Earl Johnson is pilot.

PACIFIC AIRMOTIVE CORP.'S Burbank, Calif., Aircraft Div. delivered to Bethlehem Steel Corp.'s chief pilot, A. E. Junker, first of two Convair 440s after installation of extended fuel and oil system, auxiliary power unit, additional ADI tank, automatic spark advance, additional window in forward cargo door for third crew member station, true air speed indicators, Sperry engine analyzer, Westinghouse Air Brake Decelostat anti-skid units, complete interior and custom radio. Arnold Haines was resident engineer while ship was in work at PAC.

EXECUTIVE AIRCRAFT SERVICE, INC., Dallas, Tex., has moved to Redbird Airport 10 miles South of Love Field and has completed the following work:

Odessa Natural Gasoline's Lodestar, piloted by Ray Hodge, was brought in for annual inspection, installation of Learstar wheels and brakes, and new cabin rug.

The Dow Chemical DC3, piloted by Ted Merchant, had annual inspection, attach angle bulletin compliance, installation of new ADF's, and radome replaced.

E. W. Brown, Jr.'s DC3 was brought in by R. F. "Wimpy" Neel for a right engine change and misc. repairs.

Holly Carburetor's DC3, flown by Orville E. Sparks, had annual inspection, installation of short exhaust stacks and Trans-Air main gear doors, and repainted aircraft exterior.

BAYAIRE AVIONICS INC., International Airport, Oakland, Calif., installed Narco Mark II Omnigator, Lear ADF-125, RT-10 EP, antenna, cables, other equipment, in Navion of Glen Stanley, Key System Transit Lines president.

Bechtel Corp.'s Lodestar had 300-hr check on radio gear. Chief pilot is A. K. Rodan.

California Standard Co.'s Boeing 247D had installed a Dual ARC-21A ADF, ARC 15-D System, Narco 1016-90 channel, ARC R-11A receiver, ARC L-10A loop, R-89B Glide Slope receiver and other equipment. Chief pilot of Canadian-based plane is Dick Cull.

GRAND CENTRAL AIRCRAFT CO., Air Terminal, Fresno, Calif., opened its third, largest, facility at base formerly

operated by North American Aviation, Inc. More than 200,000 sq.ft. under roof. A 9,000-ft. paved runway.

National Seal Div.'s DC-3, Marshal George, chief pilot, was in for paint job and miscellaneous work.

OAKLAND AIRMOTIVE CO., International Airport, Oakland, Calif., delivered to The California Standard Co. a Boeing 247D after 8,000-hr overhaul, recondition of airframe and complete rebuild. It is piloted by Gordon Cameron with Alfred Taylor as

flight engineer; to be based in Canada.

Columbia-Geneva Steel's Lodestar had annual inspection and relicense. Pilots are Jim Richter and Norm Mahaffey.

Lawrence Warehouse's B-25 received a 50-hr inspection.

Trailmobile's Lodestar, flown from Cincinnati by Carl Siemer, had 25-hr inspection and tank reseal.

BAY AVIATION SERVICES CO., International Airport, San Francisco, Calif., performed double engine change on Pope and Talbot Twin Beech, piloted by Sandy De Ranzo.

Petersen Aerial Photography Co. had Tactair Auto Pilot installed on Cessna 180. Pilot is Sydney Petersen.

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In the past 25 years, Southwest Airmotive Co. has kept a sharp and continuous focus on Lockheed-built business airplanes, from the Orions and Vegas, through the 10's, 12's, 14's, Lodestars and PV-1's, and their blood-brothers, the Learstars and Super Venturas.

Result: SAC knows Lockheeds like no other maintenance specialist in America. This fact is borne-out by an almost-endless list of Southwest-originated Lockheed

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■ **AIR CARRIER ENGINE SERVICE, INC.**, Miami, Fla., converted Thatcher Glass Co.'s PV to R-2800-M2 engines and completed 100-hr check. Pilot is Torch Lewis.

■ **PACAERO ENGINEERING CORP.**, Santa Monica, Calif., delivered Learstar Mark II to Lloyd Rondeau, chief pilot, for Solo Cup Co.

Westinghouse Electric Corp., Pittsburgh, took delivery of their Learstar Mark II. A. C. Korb is chief pilot.

British American Oil Co. Ltd., Toronto, brought their Learstar in for major repairs and modifications.

Plymouth Oil's Mark II was in for miscellaneous work. Jim Hickerson is chief pilot.

Sangamo Electric had one of their Learstars in for annual inspection.

Marathon Corp.'s Mark II was flown in by Al Pinckley, chief pilot, for annual inspection.

Burroughs Corp.'s Learstar had new paint job, wing fillets and other work done. Don MacDonald is chief pilot.

■ **PLANESERVICE, INC.**, Van Nuys Municipal Airport, Calif., completed a unique, successful installation of ARC 15D omni system in Bonanza owned by Powers Tractor Co. Bob Powers is pilot.

David Myers' Bonanza had 100-hr inspection.

Charles Huntington had installation of ARC VHF receiver in his Bonanza.

Lawrence O'Connell's H-35 Bonanza received its first 100-hr inspection.

■ **PIEDMONT AVIATION, INC.**, Winston-Salem, N.C., completed 100-hr inspection of Slane Hosiery Mills' D18S. Pilot is Willis Slane.

Carolina Pacific Sales had engine change, 100-hr inspection and Tactair Auto Pilot installation on their PA-23. Pilot is John Colucci.

Motor Parts Sales had 100-hr inspection on PA-22 flown by Gwen McNeil.

Houdaille, Inc., flew their DC-3 in for new wheels, brakes and new wing flap indicator.

National Gypsum's DC-3, flown by Dick Notebarte and Ralph Palermo, was in for 4,000-hr inspection and service bulletin compliance.

Chatham Manufacturing Co.'s Malard had miscellaneous repairs. Pilots are Dale Balzer and Don Monson.

■ **GARRETT CORP.'S AIRESEARCH** Aviation Service Div., Los Angeles International Airport, is doing extensive work on Convair 340 purchased by IBM Corp. from United Air Lines. Work includes exterior painting to IBM's color scheme, installation of customized executive interior, additional radio equipment, Convair speed and sound kit to convert plane to 440 configuration, auxiliary power unit, long-range fuel tanks, Sperry engine analyzer and auxiliary ground heating system. Delivery was made by Chuck McKinnon, manager of flight operations and John Powers, chief pilot.

■ **SOUTHWEST AIRMOTIVE CO.**, Love Field, Dallas, Tex., made double en-

gine change on Shamrock Oil and Gas' D18S Beech. Pilot is Tom Smith. Same treatment was given firm's Lodestar, piloted by Jimmy Boyd.

Ray Smith's Lodestar was flown in by Al Phillips for an engine change and oxygen installation.

Michigan Tool's Lodestar was flown in by Paul Holst for miscellaneous work.

■ **L. B. SMITH AIRCRAFT CORP.**, International Airport, Miami, Fla., completed control surface modifications, repairs to Jack Southerland's Aero Commander.

Air Transit Services' C-46 was converted to Super 46-C by installation of AEF-SMITH modification kit to raise gross weight to 50,100 lbs.

Thatcher Glass Manufacturing Co.'s PV-1 received radio and radar modifications.

Square "D" had 100-hr inspection and relacerise of their Learstar.

■ **TIMMINS AVIATION LTD.**, Montreal, Que., Canada, reports Federal Equipment's deHavilland Dove received 100-hr inspection, installation of ARC 15 D Omni, ARC CDI Course Director and DARE 360 channel transceiver. Pilot is Bill LeSavage; co-pilot and engineer, Dave Haines.

Canada Packers' Lodestar had de-icing modifications completed, newly modified cowl flap installation and inspection. Ted Lawrence and Bill Vehey are the pilots.

Noranda Mines, Ltd.'s Lodestar CF-TCV had 400-hr major inspection and double engine change.

Canadair Ltd.'s DC-3 Dakota is undergoing 100-hr check.

■ **CAPITOL AVIATION, INC.**, Capital Airport, Springfield, Ill., completed new paint job, double engine change, radio modifications and heater modifications to Kroehler Mfg. Co.'s Lodestar. Bob Hanson is pilot.

Northern Electric Co.'s E18 Beech was in for ARC ADF radio installation. Bill Williams is pilot.

Sangamo Electric Co.'s D18S Beech was in for paint job matching their Learstar.

■ **POTTER AIRCRAFT SERVICE, INC.**, Lockheed Air Terminal, Burbank, Calif., completed 100-hr inspection of Edwin W. Pauley's Lodestar. Chief Pilot Milt Keyes; co-pilot, Chuck Ryno.

Occidental Petroleum Corp.'s D-18S had 100-hr inspection. Pilot is Frank Walker.

Clyde Wood Construction's Piper Apache had 100-hr inspection. Chief pilot is Merle Edgerton.

Fluor Corp.'s Lodestar had de-icer boots installed plus dual fuel system, new instrument panel, new electric panel and 100-hr inspection. Harry Conover is chief pilot.

■ **GREENSBORO-HIGH POINT AIR SERVICE, INC.**, Greensboro, N.C., completed 100-hr inspection and miscellaneous work on Gardner Enterprises, Ltd., Twin-Beech.

Capitol Products Corp.'s Twin-Beech had 100-hr inspection. M. A. Austill is chief pilot.

Marus Marble and Tile Co. and **Southeast Transport** had 100-hr inspections of their Bonanzas.



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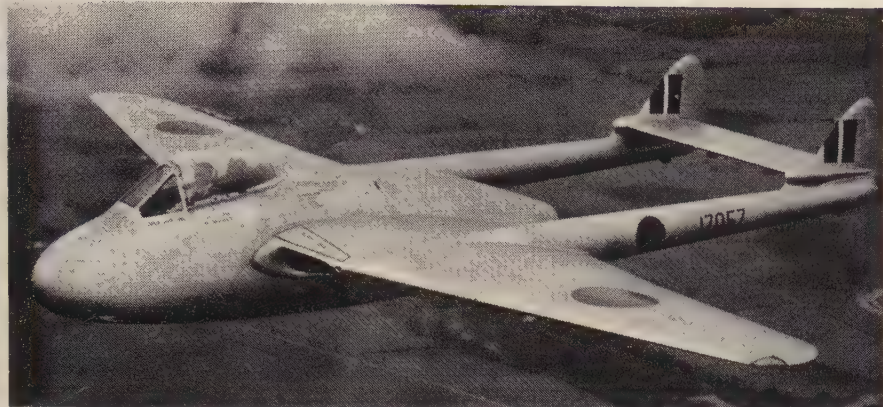
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		LYNCHBURG Preston Glenn Airport LYnchburg 3-3134	

Vampire Jets For Business



The Canadian government's Crown Assets Corp. has sold 26 surplus Vampire jet fighters to an American firm, the Formetal Co., West Bend, Wisc. Merle Zuehlke, president of Formetal, declined to state exactly how much was paid for the tiny twin-boom fighters of yester-year, but admitted that it was in the neighborhood of \$1 million. Included in the deal was a quantity of spare parts and extra engines.

Said Mr. Zuehlke: "These are the first military jet aircraft released for civilian use anywhere in the world."

Small, light and easy to fly, the twin-boom pocket editions were designed during World War II.

In its hey-day, the Vamp was touted as a high-level performer. However, even before its eclipse as the best, the British had recognized its value close to the deck. The Mark 5 ground attack version was brought out.

In place of bombs drop tanks for added range are mounted on the Vampires bought by Mr. Zuehlke for conversion to a civil role.

Formetal specializes in refitting and conversion of military aircraft for civilian use. Recently the company purchased six TBM Grumman Avengers which had been retired from Royal Canadian Navy use at Shearwater, Nova Scotia. These aircraft were converted for use in crop-planting and spraying work in the U.S.

The Vampire jets which have been purchased by Formetal, will be extensively modified prior to being re-sold in the civilian market. It is anticipated that some of them will be sold as business executive aircraft, being a follow-up to the F-51 Mustangs that some American businessmen are presently using. Other Vampires will be re-built for high-level photo survey work. It is felt that the higher costs in fuel consumption will be more than balanced by the cheaper maintenance of the Goblin II engines. Some of the Vamps will under-go major changes to the fuselage, having it elongated to permit a second cockpit, or for camera installations.

Minimum Equipment Night & IFR

Canada's Department of Transport has proposed new air navigation orders setting forth the minimum flight instruments considered, by the Department, to be necessary for flight at night and minimum instruments and equipment for flight under IFR conditions.

The department wants to see night flying aircraft on local flights (i.e., within 20 nautical miles of the airport from which the flight originates), equipped with at least airspeed indicator, sensitive altimeter, magnetic compass and rate of turn indicator, all of which must be adequately lit for easy reading. Aircraft being used on night flights beyond the 20 mile limit will also be required to have a gyroscopic direction indicator.

Aircraft engaging in IFR flights will have to have an airspeed indicator, sensitive altimeter, magnetic compass, gyroscopic directional indicator, gyro-

scopic turn and bank indicator, gyroscopic bank and pitch indicator, vertical speed indicator, and free temperature gauge. As insurance against a power failure, a second power supply source for the instruments is mandatory.

Minimum communications requirements call for radio equipment adequate to receive such signals from radio aids as are necessary to operate with safety. A radio compass or a 75 mc marker receiver must be included.

Winnipeg's Volunteer Air Patrol

An organization of civilian pilots and aircraft owners in Manitoba, the Volunteer Air Patrol was formed in February 1957 to assist the RCAF, Red Cross and Civil Defense authorities in any local or national emergency.

The VAP has total membership of 80 people between ages of 19 and 65, and includes doctors, lawyers and teachers. The organization is prepared

to help in air searches, to patrol evacuation routes or to airlift doctors and medical supplies to stricken areas.

The western group was responsible for sparking the first National Civil Defense Air Forum meeting at Arnprior, Ont., last May. An estimated 25 representatives from civil air patrol agencies from across Canada attended to probe possibilities of a government-backed civilian national air patrol.

At time of writing, the air patrols in Canada have not received official endorsement of the civil defense, federal government or the RCAF. On the other hand it is pointed out, they have not been rejected either. Says Bill Peppler, manager of the Canadian Owners & Pilots Assn.:

"We have something very definite to offer air defense and air rescue here in Canada. We have the types of planes that can augment the search pattern of faster airforce planes, and we believe we could contribute valuable assistance to the RCAF or the Civil Defense in their many exercises."

Malton Airport Fire

A blaze fanned by 40 mph winter winds ripped through a hangar at Toronto's Malton Airport which was shared by two companies: Sanderson Aircraft Ltd., and Garratt Aircraft Ltd. Destroyed in the 45 minute conflagration were 12 light aircraft; 11 of which were owned by Sanderson, Canadian distributor for Cessna Aircraft. The other aircraft, a Cessna 170, was owned by Chris Shields, of Toronto.

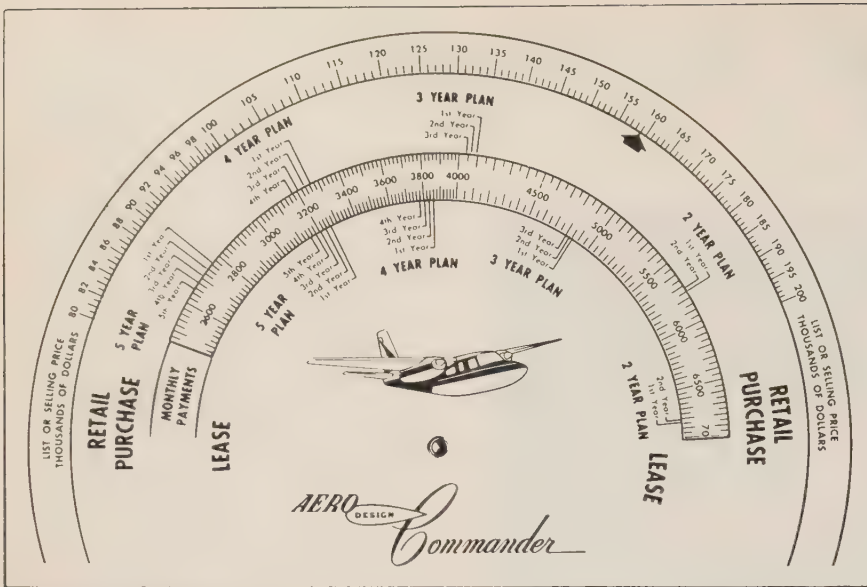
Officials of the Garratt company said that two milling machines valued at \$150,000 each were lost. Total cost of the fire is expected to be around \$750,000. Garratt is engaged in the manufacture of component parts on subcontract basis for Avro and DeHavilland aircraft companies.

Trevor Acfield, sales manager of Sanderson, reports the company is now operating in the Toronto Flying Club hangar at Malton on a temporary basis. The radio shop has been set up, a sheet metal shop organized and the company can now offer aircraft engine maintenance and airframe overhaul service.

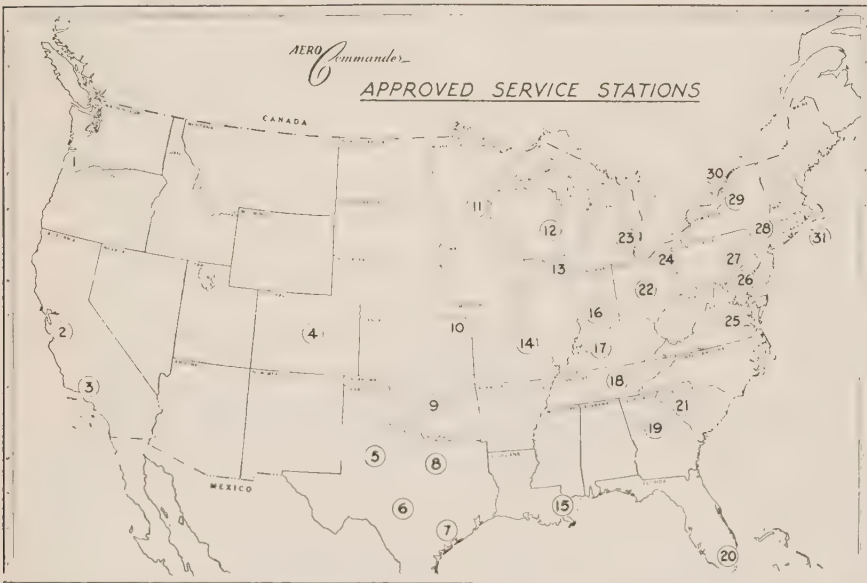
Altitude Assignment Control

An altitude assignment control similar to systems in use in USA, provides controllers at Uplands and Dorval terminals with a visual picture, by means of a panel of lights, of the various altitude levels used by aircraft on the Montreal-Ottawa airway indicating whether or not they are occupied. This is the first of six installations to be put into use across Canada. The remaining five will be in operation early this year.

Aero Design's WHEEL of FORTUNE



"WHEEL OF FORTUNE" computes monthly rates for Commander lease or installment buying.



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Part of new growth vigor at Aero Design and Engineering Co., including a new \$6,650,000 plant at Tula-kes, Okla., is a unique sales-lease computer which offers a new approach to executive aircraft sales.

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When the prospective buyer has been "sold," he will have 31 approved service stations sprinkled across the nation to take care of the new possession . . . and long after the new-ness has worn off.

The lease financing plan includes purchase option. Personalized touches to the plane are offered by the company which will build to the buyer's specifications. Full hull coverage and substantial liability insurance are included in the monthly lease payment.

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RICHARD W. GROUX, Assistant to Executive Director NBAA

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Truth and Consequences

AIR-LOGY—Navy Twin-Beech became airborne in a normal, wings level attitude, then pulled up into an abnormally nose-high climb. Between 100 and 200 feet it had an estimated 40 to 60-degree nose-up attitude. The Beech fell off to the left, rolled inverted, and dropped into a steep dive. The nose then pulled through rapidly but there was insufficient altitude to recover from the dive. All occupants died in the subsequent crash.

Both pilots were considered to be conservative in their flying habits. Obstacle takeoffs were not practiced by pilots in the command concerned, besides which, the flaps were up and the gear was extended throughout the short flight. Thus, it was considered unlikely that two experienced pilots would deliberately pull a Twin-Beech up to such a steep angle of climb immediately after takeoff as described by witnesses.

After the crash all control cables were traced out and found to be properly rigged and when crash-caused binding was removed, the cables and remaining tail control surfaces could be moved without difficulty. From an examination of the tail surfaces the rudder tab was neutral and the elevator tab was in a slight nose-down setting, normal for takeoff.

Prop and jet wash was a possibility but not a large one. Seemingly, the investigation was blocked. Then, as investigators poked further into the wreckage, a possible answer emerged.

The cabin air heat intensifier tube at the forward wall of the collector ring of the port engine exhaust stack was found completely broken. It appeared to have a rubbed and leaded area extending halfway around the circumference which was not crash-damaged. The force of the crash had broken both engines loose and they had not been exposed to the fire which mangled the forward section of the Beech.

When this element was added to the fact that the pilot's cabin heater was found in the full hot position, the investigation took a new direction. *If such a failure did occur, it would allow a carbon monoxide concentration to enter the cockpit through the heater system.*

In a test, the broken cabin heat intensifier tube was installed in another Twin-Beech to evaluate the effect it might have in inducing carbon monoxide into the aircraft cabin. The phases were simulated from start through a high power run to simulate the takeoff.

The exact extent of the intensifier tube failure and the effect the break had on the pilots prior to the accident

was not known of course, but after four minutes of the test (simulated taxiing) the air sampling showed approximately .02 carbon monoxide on the Colorimetric type tube indicator. This is maximum allowable for taxiing. At eight minutes, and on every sampling thereafter, the color change showed a full scale reading of .04 carbon monoxide. The pilot and copilot on the test had blood samples taken for carbon monoxide toxicological tests and the results were reported as two percent and three percent. This is not considered significant by medical personnel, but there is some reluctance to say such a dosage would not affect a pilot's capabilities, due to individual variables involved.

It was noted in an endorsement on the accident report that "There is no definite evidence to indicate that carbon monoxide poisoning was the cause of the accident, but at the same time it cannot be completely ruled out."

Another endorsement noted a ComNavAirPac Bulletin will require an in-flight carbon-monoxide check each 120 hours with the heaters in the full ON position. Inspection of the intensifier tubes will be dependent upon the results of this check. Approach—USN

Locked Controls

A C-47 departed for a routine freight, passenger and courier flight. The mission scheduled two enroute stops and return to base of departure on the same day.

At the first stop a sense of urgency developed from a freight loading delay and the tardiness of some of the passengers. The pilot made a quick walk-around inspection of the aircraft while other crew members handled the freight. He failed to note, however, the rudder lock that had been installed by the engineer after parking.

Everyone aboard, the aircraft was taxied to the end of the runway. There the pilot completed a "mental" checklist and brought up the power for takeoff. Approximately 900 feet on the takeoff roll there was a lurch to the right as if a brake were grabbing. Power was cut and the takeoff aborted. The aircraft was turned around with brakes alone and taxied back for another try. On this attempt the aircraft again lurched to the right but was straightened with brake and became airborne. Wind conditions were severe and highly variable which were characteristic of the location. As soon as the aircraft got in to the air it became obvious the rudder lock was on. Without rudder control, the aircraft progressed danger-

ously sideways—if this can be called progress—as the pilot fought to keep it flying in the rugged winds. As airspeed was gained, control became more positive with aileron and variable power.

Because of the surface wind conditions and poor crash facilities, it was decided to fly the airplane on to the next stop rather than attempt an immediate landing at the takeoff base. This was done and the landing at the next base was uneventful.

The old Gooney Bird has been around a long time and it will forgive a few indiscretions; *but if this aircraft had suffered the loss of an engine during the flight to the next base, forgiveness might have been stretched beyond the point of no return.*

It seems inconceivable that an experienced pilot could take the aircraft nearly 1,000 feet down the runway on a gusty crosswind takeoff without realizing the rudder lock was on. Add to this the abort and taxi back for another try and it is even more incredible.

The written checklist calls for the controls to be checked for freedom of movement. Obviously the mental checklist did not.

This happened to an experienced pilot. It could happen to you! Use the checklist.

(Editor's note: Here is a recent business flying report with the same moral. A corporation owned Lockheed departed its southwestern base on an IFR cross-country. The flight was uneventful until the aircraft initiated an ILS approach at its destination. The pilot aborted the approach. While executing a go around indicated to the tower that he was experiencing a structural malfunction involving his rudder controls. After some consternation both on the ground and in the aircraft a successful landing was accomplished on the second attempt. It wasn't until the aircraft was cleared to the ramp that the pilot learned that the "structural malfunction" consisted of the rudder gust lock still in place.)

Combat Crew—SAC, USAF

By Col. R. W. Stanley, Chief, Safety Div.

Experimental Runway Flood-Lights

The CAA is installing experimental runway floodlighting near the approach end of runway 36 at Washington National. This will be a continuous line of low mounted fluorescent lights along either side of the runway for a distance of 1,300 feet. The light tubes are eight

(Continued on page 48)

The Law Behind the Skyways

by Howard Newcomb Morse, Counsellor at Law. Member of the Bar of the Supreme Court of the USA

The Meaning of 'Airworthiness'

Federal law, 49 U. S. C. A. section 553 (c), states that: "The registered owner of any aircraft may file with the Administrator of Civil Aeronautics an application for an *airworthiness* certificate for such aircraft. If the Administrator of Civil Aeronautics finds that the aircraft conforms to the type certificate therefor, and, after inspection, that the aircraft is in condition for safe operation, it shall issue an *airworthiness* certificate."

It is important for the owners and operators of business aircraft to know what the term "airworthiness" means. The word is not defined in the law dictionaries or in the legal-lexical encyclopedia Words and Phrases. However, Webster's New International Dictionary, 2nd ed., unabridged, defines the term "airworthy" as follows: "Fit for operation in the air; able to bear the strains of flight, to withstand storms, etc., as an airplane.—airworthiness."

Case law casts light upon the legal meaning of the word "airworthiness." The United States Circuit Court of Appeals for the Tenth Circuit in 1942 in the case of *Rosenhan vs. United States* declared that: "It (the federal law) authorized the authority (the C.A.B.)

not only to establish and to regulate airways, but to regulate and prescribe the *mechanical standards* for aircraft to be flown within the designated airways." Therefore, it can be said that airworthiness means compliance with the proper *mechanical standards*. The *Rosenhan* case held that the purpose of the federal law was to "develop and secure maximum aeronautical safety." So, in construing the two statements from the decision together, it can be further stated that compliance with the proper *mechanical standards* would include the use of accepted safety devices and features.

The Court of Appeals for the Ninth Circuit in 1952 in the case of *United States vs. Eagle Star Insurance Company* declared that: "... the aircraft attempted to take off at a time when it was carrying a load approximately 28% in excess of the limits permitted under the regulations prescribed by the Civil Aeronautics Authority (Board) for this airplane ... appellees' position appears to be that the overloading operated to invalidate the certificate of *airworthiness*. We cannot come to any such conclusion." Thus, such factors as cargo and personnel are not determinative of the element of airworthiness. Rather, the meaning of "airworthiness" as used

in the federal law is restricted in its application to the physical structure of the aircraft.

The quality of airworthiness is a variable depending upon the type and structural design of the aircraft. What would constitute airworthiness in a small airplane of simple design would not necessarily constitute airworthiness in a large airplane of elaborate design. At this point aeronautical law can profitably borrow by analogy from admiralty law and look to an interpretation of the term "seaworthiness," which is the maritime equivalent of "airworthiness." The District Court of the United States for the District of Maryland in 1942 in the case of *The Bill*, in considering the varying quality of "seaworthiness," stated that: "... the structural design of the ship presented a number of somewhat unusual features which in combination created the hazard which resulted in the loss and which, known of course to the shipowner, required more than ordinary care." Accordingly, the requisite degree of care to establish and maintain airworthiness in an airplane of simple or common structural design probably would not suffice for an airplane of complex or unusual structural design.

END

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Civil Aviation's Growth Told In New CAA Handbook

The 1957 edition of the CAA Statistical Handbook of Civil Aviation is a 35-page book depicting the development of civil aviation from its early days through 1956. It is published by the CAA, U.S. Department of Commerce.

The Statistical Handbook may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Wash. 25, D.C., for 60 cents.

New tables in this year's edition include one which shows the cost of implementing the program for expanding and modernizing the Federal Airways system, one showing U.S. active civil aircraft by number of seats, one on age of airmen by age groups and a summary showing the rapid growth of U.S. flag air coach operations.

'58 Bonanza

(Continued from page 15)

...a good deal less than 1,000 ft. But I found myself airborne several hundred feet short of the puddle and pulling the nose up at a ridiculous angle to hold 100 mph.

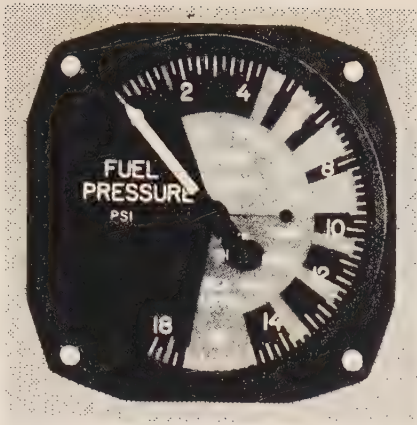
You never quite believe a demonstrator pilot. So I felt a little foolish when I realized I was leaving the pattern at 100 feet with the gear still down! A Bonanza pilot usually "cleans up" his airplane as soon as he breaks ground as in any high performance ship.

Incidentally, pulling the gear is not unlike the effect when you "hit the water" on takeoff in a Convair the first time. Lacking the high-rpm vibration of a carbureted engine, you have to remember to come back on the power to climb configuration. In this airplane, you could stay with max power a lot longer in hot weather because the fuel injection distribution insures a more accurate head temperature reading.

The airspeed dial is calibrated in both mph and knots, a boon in ATC handling. At climb figures, 25 inches over 2450 rpm sea level, 100 IAS, we backed off from more than 1,600 fpm at 1,000 ft to almost 1,100 fpm when I leveled off slightly above 8,000. Allowing for maximum gross of 2,900 lbs at takeoff, this would be a good airplane to top a turbulence level or an average top of clouds.

It's almost redundant to dwell on any Bonanza's handling characteristics. As with most airplanes, any pilot with 50 hours in any type will do a little saving. Bonanza pilots are just more so and this new '58 "J" will make them a bit insufferable. I will say simply that the "J" has a little more positive feel about it that both "big ship" pilots and others will like.

On the way out, I had plotted two ten mile fixes for a crosswind speed run. After leveling out on the step at 3,000, we arbitrarily selected 22-in. manifold pressure over 2,300 rpm. Taking temperature and pressure altitude accountability, the indicated 183 came out 202 mph on my prayer wheel with



only 65 percent power which was all we could get at wide open throttle despite the cold air.

Beech claims 200 at 75% power at 7,000 ft standard air so this was a mite better if you want to believe your eyes. While I distracted Gene with small talk about cockpit details, I hit my ground fixes and clocked the ten miles in 3:12 for 194 GS crosswind one direction. A snappy 180 at 60 degrees—to "check the weight of the nose in a steep turn"—and I went back over the course in 3:14 for 192 GS. I don't know what the wind was at 8,000 ft, but LaGuardia was quoting the surface wind as 25 to 30 knots from the north (90 degrees cross) so I have a hunch that Beech has it—a good clean, well-behaved personal business plane that delivers 200 mph cruise without attaching an oversize powerplant out front to bruise its way through the air!

A few maneuvers customary to feel out slow flight behaviour and we were ready to go home.

Speed is nice and Bonanzas have always had it. Except for that plus the 1,000 mile range at 65 percent to run around weather instead of through it, there is not much new to talk about performance-wise. I would like to see Beech arrange things so that you could just attach an oxygen bottle to a fixture in the baggage compartment to plug in up front with your masks. This would facilitate the "average" over-weather flying of which the ship is capable without the "on seat or floor" problem or tearing up the upholstery.

Handling in the pattern and over the fence on final is familiar to Bonanza pilots. Rule-of-thumb figures like 100 mph until ready to drop flaps on final, then 80 to 60 over the fence depending on load and degree of flap and power

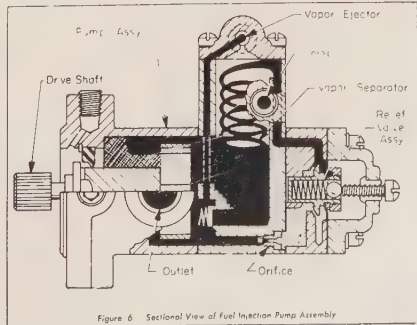


Figure 6. Sectional View of Fuel Injection Pump Assembly



PROMOTER OF AVIATION

Harry Frank Guggenheim bears an illustrious name in aviation. A naval flyer in 1917-1918, he later organized the nation's first passenger airline, established weather stations and a flying laboratory. As President-Trustee of the Daniel Guggenheim Fund established by his father, he encouraged advancement in flying safety. In World War II he commanded the Naval Field at Trenton, N. J.

Progress in aviation was also dependent upon financial stability. This came in 1928 when the United States Aircraft Insurance Group was organized to pioneer "aviation insurance".

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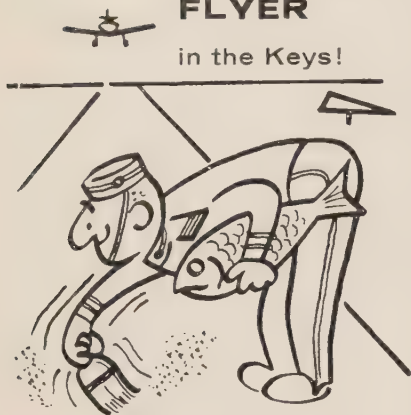
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desired at the moment and air conditions felt safe to me. If anticipating propwash or much turbulence over the runway (the speed drops off quickly enough when you cut), I wouldn't hesitate to hold an extra margin. And the "J" felt exceptionally good with a little power all the way in.

A controversial point in question arises when you note that Beech has put a placard on the back of the glove compartment door, instructing the "VFR pilot" how to make an instrument let-down to contact through an under-cast if caught on top of a solid condition! My reaction is that people who buy this airplane with its outstanding performance at proportionate premium price are going to demand utility that can only be achieved by more frequent exposure to instrument flight conditions.

If they are not wise enough to acquire IFR capabilities in themselves, they must rely on those built in to the airplane. I don't think Beech has invited their customers to "go too far" but has just recognized the facts of life and put a "life preserver" on board for the rare occasion when it may be needed. Essentially, Beech notes that *the airplane* is fully "IFR qualified" and tells the VFR-pilot how to let the airplane do the job safely and competently!

A full explanation of the unusual and happy operating characteristics of the fuel injection Continental 10-470-C engine can be obtained easily elsewhere so while referring you to the almost self-explanatory diagrams in this article, I would like to bring out the outstanding points of direct interest to the pilot. I can think of no better way of telling the story than by quoting Atlantic's superlative maintenance chief Bob Scarsdale.

Talking about the two-speed electric boost pump that has obsoleted the familiar wobble pump, Bob pointed out "The boost pump provides just enough pressure—2 to 2½ lbs—to unseat the check valve (see diagram), the spring tension being very light. Fuel drops down through the air-fuel control and the metering device to the fuel manifold distributing point to the cylinder discharge nozzles, and you can start your engine."

On the injector pump vapor separation system, he explained "When the fuel first enters the injector pump from the tank, it gets swirled around like crazy, separating the vapor which is syphoned off at the top by a jet of fuel from the pressure side of the pump—like the garden hose attachments you use to drain your wet cellar—and is returned to the tank so that only liquid fuel goes on to the fuel-air control unit."

On the return fuel operation of the mixture control unit, Bob said, "The fuel we decide we need by manipulation of the control is carried to the fuel manifold valve (see diagram) while the unwanted fuel is carried back to the inlet side of the injector pump to recirculate through the system."

On the cylinder fuel discharge nozzles he continued, "Each line has at its base a nozzle leading into the intake port of the cylinder. Each has a skirt, a good term,—and little peep holes drilled in each skirt to aerate the fuel just as you aerate water from your kitchen tap. This really does two things—breaks the fuel into a vapor or emulsion more readily mixable with the incoming air, and when the throttle is

closed, it acts as a suction break, a syphon block if you wish, to prevent the vacuum action of an idling or retarded engine from sucking the fuel out in excess quantities. This vacuum is quite strong, just as in a car your windshield wipers speed up when you ease up on the gas pedal."

On the use of the high side of the boost pump Bob said, "Although fuel pump failures have been few, the safety inherent in dualization is a bonus to the owner, as he can continue flight in event of engine pump failure—to the nearest Beech or Continental service station."

On the added fuel pressure gauge—(see cut), Bob declared, "This is a natural. Any pilot can operate like a 1000-hour (on a Bonanza) pilot the first time out. In fact, many may use it as a flow meter, since, in addition to controlling RPM accurately, they can now read with accuracy the amount of fuel going into the engine."

"The altitude markings seen on the lower right half of the gauge suggest the fuel pressures to be selected for best operation, takeoff and climb, at those altitudes. No guesswork, no feel—use your mixture control and be right every time!

"The upper right half shows the ideal settings for desired cruise powers in various ranges. Adjusting the mixture control so that the needle moves counter clockwise to the left or upper edge of each power segment will guarantee the maximum economy for that operation."

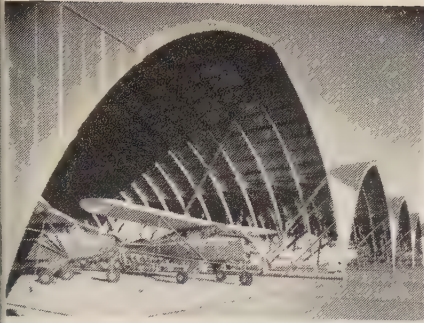
On maintenance and field adjustments Bob advised, "The nozzles so far seem to be trouble free. Should foreign matter clog them, immerse in pure solvent only, do NOT pass anything through them! They are calibrated at the factory for *each* engine and if you do have to replace for wear, replace with identically-marked nozzles, an "O" for an "O", a "J" for a "J" and so forth. We are estimating inspection for replacement at around 200 hours—we're not certain yet."

"Do not allow anyone to touch the adjustment screw on the injector pump! This is a must—a factory deal only." (Ed. comment—Why doesn't Beech or Continental remove the exposed key-slotted type shaft, or cap it with a red friction or screw cover-placarded?)

In regard to icing, Bonanzas have already attained an enviable record with the simplicity of their automatic alternate air when retarding throttle. The "J" goes a step further with a spring-loaded alternate air door that, under impact icing or any obstruction like a bird on takeoff, the engine vacuum is sufficient to suck the door open and the engine automatically takes its air from inside the cowling. There is NO carb heat control in the cockpit.

So, Beech and Continental have gotten themselves a significant "first." The first modern, practical 200 mph single-engine personal or business airplane plus a simple, virtually ice-free, dual fuel system engine that any non-professional pilot can operate efficiently the first time out.

✚✚



TEMPORARY PLANEPORTS to store 18 to 24 business-type aircraft are shown here at Tucson Municipal Airport, Ariz. They are made of prefabricated laminated wood trusses and corrugated metal adapted from standard barn roofs. Total cost of six units was \$19,994; per plane cost from \$833 to \$1,110. Units may be moved intact.

United Kingdom and United States Air Authorities Plan To Align Performance Requirements

Meeting in Washington, D.C., Walter Tye, chief technical officer, Air Registration Board, U.K., and W. E. Koneczny, chief, Airworthiness Division, Civil Aeronautics Board, studied the possibilities of reducing the difference between the UK and US aircraft performance requirements.

It was agreed that material advantages would be gained if the two per-

formance codes were substantially in alignment. Such a program would facilitate the operation of aircraft built in one country by operators of the other country. In addition, manufacturers hoping to sell their airplanes in both countries would avoid the need for the present costly flight tests.

New Executive Aircraft Hangar At Houston International Airport

Completion of a hangar capable of storing 14 aircraft is announced by Houston Executive Air Service, Inc., Houston, Tex.

In addition to the new structure there is a 12-plane hangar. Reg Robins, the firm's general manager, said that both hangars have air conditioned pilots' rooms and lounges plus office and shop space for customers. The service offers complete mechanical and service facilities, including starting equipment, for jet airplanes, the only such service at the airport.

Another new feature is a special radio receiving and transmitting station which has its own short wave band for executive aircraft. Incoming aircraft can call from 100 miles out to order taxicabs, services, etc.

Portable Self-Powered Electronic Instruments Aid Ground Maintenance

Two portable, self-powered electronic

instruments of unmatched accuracy for use in ground maintenance of aircraft have been announced by Lycoming Division, Avco Manufacturing Corp. Both are accurate to better than ± 0.1 percent over the entire operating temperature range.

The *Volt-Ohm Frequency Meter* combines all necessary test instruments used in electrical aircraft maintenance and laboratory work into one small light-weight (six pounds) package. It is completely self-powered requiring only two small flashlight-type batteries for operation.

The *Frequency Meter* is the only known electronic frequency meter on the market which does not require an outside power supply.

In the Safety Digest column of our February issue we stated in an article entitled—New Dri-Powder Extinguisher—that "Dry powder is the only extinguishing medium which can be used safely on a human being whose clothing is on fire." This should have read, "Dry powder is the only *manufactured* extinguishing medium..." The manufacturer advises us that bicarbonate of soda is less injurious on contact or when absorbed internally than any other chemical extinguishing agent.



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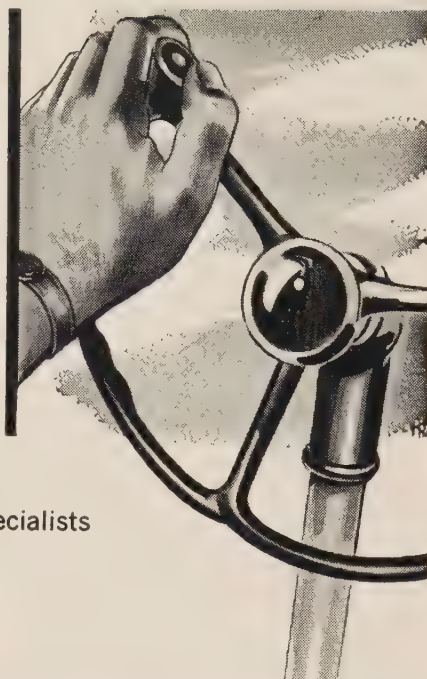
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Learstar

(Continued from page 13)

0501 GMT—ABEAM CORAL HARBOR

Navigator Dohm sent up a position report. They were still on course and on flight plan. Fuel consumption was down to 92 gph.

Flight plan ETA of 0609 needed no revision.

Suddenly, a problem confronted the crew—the first and only one—the coffee supply was getting dangerously low!

0532 GMT—DEPARTED 13,000 FEET

The Learstar began its descent. Captain Herman disengaged the autopilot. The ADF bird dogs had picked up the scent of Frobisher Bay radio.

At 0603 GMT Captain Herman was in contact with the tower.

A check of the fuel revealed they had almost four hours of gas remaining.

Herman turned on final approach. He brought the Learstar over the fence at 103 mph and touched down at 96 mph.

0611 GMT—ON THE GROUND

0614 GMT—ON THE BLOCKS

The new flight plan was worked out over a great circle route to Prestwick, Scotland; there to enter airways and continue to Dusseldorf.

In one hour the Horten Learstar was refueled and ready to go.

No maintenance was required and not a drop of oil had been consumed.

The ground temperature was 25 below zero. The Learstar started its engines on ship's batteries without difficulty.

Captain Herman was again at the controls with Captain Roemerschmidt still flying shotgun and Vern Benfer at the over-the-shoulder position.

The coffee supply had been returned to a safe level and the Mark I was cleared to leave the blocks.

0714 GMT—OFF THE BLOCKS

The Mark I was at full takeoff gross weight of 24,000 pounds and carried 1,340 gallons of fuel.

0720 GMT—AIRBORNE

With the temperature of minus 25 degrees and a strong wind right down the runway, the Mark I took off like an eagle which had just pratt-fallen in a pool of wintergreen.

Captain Herman made the takeoff.

The normal tailwinds on the great circle route to Europe were missing and the Mark I had to battle a minus wind component.

Flight plan time was 11 hours and 21 minutes.

0734 GMT—LEVELED OFF AT 13,000 FEET

Power configuration was set up for 680 hp.

Autopilot engaged.

True Air Speed checked out at 277 mph.

Ground speed was computed as 245 mph.

1028 GMT—ABEAM NARSARSSUAK, GREENLAND

Celestial fix confirmed on course and on track.

Vern Benfer assumed command to

(Continued on page 40)

Reading Aviation Service's Ninth Annual Maintenance And Operations Meeting June 6 and 7, Municipal Airport, Reading, Pa.

SOUTHEAST RAMP
MAIN AIRCRAFT DISPLAY AREA

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NORTHWEST RAMP

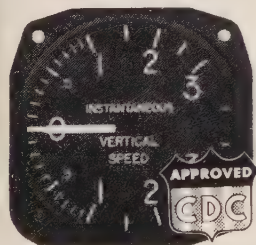
Exhibits of latest airborne and ground equipment will be displayed by leading firms in the aviation industry. Top speakers, discussion on maintenance and operations problems and awards for different categories of business aircraft make this two-day event an outstanding annual gathering.

Awards for aircraft last year included the highest designation, "Flagship of the U.S. Industrial Fleet," presented to National Dairies' DC-3. Other award categories are single-engine, twin-engine under 5,000 lbs, twin-engine 5,000-12,000 lbs; twin-engine over 12,000 lbs, and best antique airplane.

Booth space for exhibitors is shown on the chart. If needed, additional display booths will be available. **END**

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Learstar

(Continued from page 38)

give Captain Herman a breather.

1335 GMT—ABEAM KEFLAVIK, ICELAND

Weather—CAVU

1420 GMT—ON INSTRUMENTS

The Learstar entered a cloud deck. Turbulence was, at first, light and then moderate. Icing started out light and became, occasionally, moderate. Carburetor heat was applied, propeller fluid cleared the props of ice. The wing boots cracked off the wing ice on the leading edges and it quickly disappeared in the slipstream.

1530 GMT—POSITION REPORT

Navigator Dohm set up the ADFs on Barra Head radio and the Butt Of Lewis aid.

Crossed bearings fixed the Mark I's flight progress as on course and on Howgozit (fuel consumption vs miles).

1556 GMT—STORNOWAY, SCOTLAND

Air Traffic Control cleared the Mark I to descend to 7,000 feet.

1635 GMT—OVERHEAD PRESTWICK, SCOTLAND

Broken clouds below.

1722 GMT—OVER THE CHANNEL

1820 GMT—DUSSELDORF CONTROL ZONE

Ceiling and visibility reported down to minimums at Dusseldorf.



PILOT AND NAVIGATOR of polar-flying Learstar, Hal Herman, left, and John Dohm.

Captain Herman made a standard ILS approach and a night landing.

1841 GMT—ON THE GROUND

1845 GMT—ON THE BLOCKS

Twenty-three hours and 58 minutes after leaving the blocks at Santa Monica the Horten Learstar was secured on the blocks!

In commenting on the flight, Benfer said, "The aircraft performed just like a champion—as it was supposed to. We had a total of six hours of daylight and were on instruments for a couple of hours, but at no time were we uncomfortable or worried. When we landed at Dusseldorf we had nearly enough fuel left to make any alternate in Europe, including Stockholm and Rome. This flight emphasizes the fact that business aircraft can operate anywhere a commercial airliner can fly. In safety

and comfort, the Learstar can take its owners wherever they want to go, and at a time convenient to a busy executive's demanding business schedule."

Captain Hal Herman said, "We encountered all of the conditions a business flight might expect to meet. We had turbulence, ice, and, at times, sour radio communications but that Mark I cut through everything like a knife and we used far more coffee than we did oil."

"It proves to me," Navigator Dohm said, "that business aircraft can be navigated anywhere on this globe. I've had tougher trips with the airlines."

Mr. Helmut Horten was at the airport to greet the crew and his Mark I Learstar. After an inspection it was taxied into the hangar and placed beside its older sister Learstar belonging to Krupp.

Captain Herman had to rush back to Santa Monica to work on pre-test material for the 340 conversion with the Napier Eland engines, but, at the request of Mr. Horten, he flew the Horten business family to Copenhagen and left them and the Mark I there.

He picked up an SAS polar flight to Los Angeles.

Time enroute? Two hours longer than it took in the Mark I Learstar!

"Wish I could have flown a Learstar back," Herman said. "I was in a hurry to get home!"

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Maintenance Bulletin

These maintenance notes are compiled and edited from recent CAA air carrier maintenance branch and general aviation maintenance summaries, and are mailed to all NBAA members as part of their membership service.

AERO COMMANDER

Model 680—Crack in accessory housing Cover Assembly P/N-684440 (Reference Bulletin November 1957). Operator report—additional crack about two and one-half inches long and in left hand vertical fillet of accessory-case where attached to power-case. Crack started at lower left corner and extended upward. Oil leakage relatively slight for apparent size of cracks. Recommend any oil seepage in this region be closely investigated. This subject engine changed.

Interconnecting Cable—Subject part which interconnects between nose wheel and nose wheel by-pass valve failed.

Metal Skin—Inspection disclosed cracks in skin extending outward from mounting screws of outboard hinge assemblies of inboard flaps.

Throttle Control—P/N-555005-47—Throttle pulley and linkage mounting bracket, on both engines, were cracked at attachment holes.

TECHCRAFT

Model 35—Stabilizer Spar Attach Casting P/N-35-40513—The stabilizer forward spar attach casting cracked at bulkhead attaching bolt holes.

SSNA

Model 172—Left Hand Elevator—The left hand elevator torque tube rivets sheared. These are the rivets which hold the casting to the torque tube.

Model 182—Elevator (R&L) P/N-032000-154—Inspection disclosed that the corrugated skin reinforcements were bowed on the upper and lower sides of both elevators aft of the outboard hinge joints.

Fuel Quick Drain Valve—During ground handling of aircraft, fuel was observed flowing from engine compartment. Investigation disclosed fuel trainer lower cup was installed with the drain valve on aft side of bail. Upon turning nose wheel to the left the control rod contacts the drain valve and releases fuel.

Model 182 A—Heater Muff Cover—Heater muff cover slides from left to right, inflicting damage to cover at exhaust outlet.

Model 195 B—Actuator Assembly Elevator Tab P/N-0310293-11—Difficulty was encountered when attempting to operate elevator control. Inspection disclosed that the elevator tab actuator assembly had come apart. Further examination revealed that the "Tru-Arc" lock ring failed allowing the actuator to come out of the assembly, in turn forcing the tab in an uncontrolled position.

Model 310—Yoke (steering) P/N-13150-52—Pilot was unable to steer

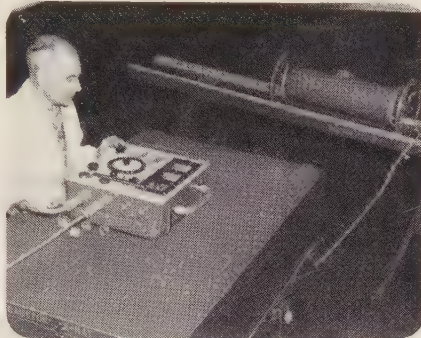
aircraft. Inspection disclosed complete failure of the steering yoke assembly where shaft is welded to the yoke plate.

Conduit—Propeller Control P/N-0850250-123—Subject part failed at the engine support web, P/N-0851500-43. Examination disclosed propeller control is supported by a clip three inches forward of point of failure. The standard installation of the aforesaid clip allows

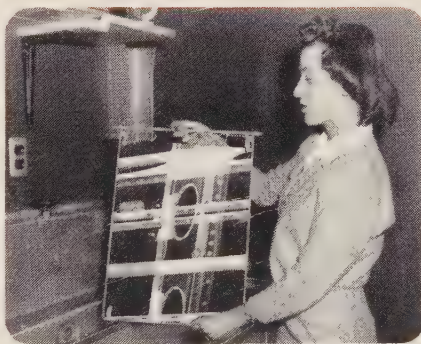
the conduit to chafe at top of lightening hole in web, resulting in the conduit separating.

DEHAVILLAND

Dove—During routine inspection of right exhaust heater pipe, found to have failed. Investigation revealed heater duct, P/N 4V137A, burned through causing buckling of stress



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plates on lower wing surface, aft of firewall and forward of spar in lower nacelle area. Repairs started per DeHavilland.

DOUGLAS

Model DC-3—On approach, excessive oil leak noted on left engine. Because of danger of fire, engine was feathered and aircraft returned. Upon inspection, tack generator gasket was found to be installed between nose case and oil scavenger line. Correct gasket installed and aircraft returned to service.

Aborted takeoff, account smoke in cockpit emanating from right upper electrical panel. Inspection revealed momentary internal short of left ammeter plus terminal and lead to indicator mechanism thence to grounded meter case. Damage minor.

Left oil pressure dropped and oil temperature rose. Rear master rod bearing failed and right side auxiliary gears and bushings deeply blued and scored. Master rod bearing failure believed caused by sludge and carbon plugging up oil holes in the rear crankpin. Metallic contamination in oil, and oil starvation caused damage to auxiliary gears and bushing.

On routine inspection found right wing top attach angle on wing butt cracked between front and center spars. Crack between four bolt holes midway between spars, also, cracked between two bolt holes 12" forward of center spar. Replaced right wing top attach angle. TSO 8328:49 hours.

On routine inspection, found left bottom center section attach angle cracked just aft of rear spar between first and third bolt holes. Found left top outer wing attach angle cracked half-way between front and center spars between three bolt holes. TSO 2467:00 hours.

On routine No. 3 check, a crack was found on front spar forward upper cap at station 97, 3¾" adjacent to spar cap cutout for upper truss and hoist fitting. Crack extended from bulb of top leg to radius of down leg. New spar cap to be spliced in front station 70 to 142, using Douglas approved splice illustrated DC-3 repair manual.

On removal of left wing for inspection per AD-39-24-1, found left center section wrap around doubler, P/N 5110506-1422, cracked at witness holes fore and aft of center spars. Time on doubler 12,374:00 hours. New doubler installed per AD-52-22-3.

Left engine induction system full of oil. Overhaul agency reports that upon disassembly and inspection of the rear section of P&W R-1830, engine, S/N 464599, it was disclosed that oil was leaking by the impeller oil seal rings due to the rings having failed to seat. This was due to a shipment of inferior rings which since have been removed from stock. New seals were installed, engine reassembled, given a check run and returned to service.

DC-3-A—Left propeller was feathered due to engine roughness and backfiring, drop in oil pressure and increase in temperature. Disassembly of the en-

gine revealed failure of front cam reduction gear, P/N 34215, and front master rod bearing, P/N 83320. Operator has changed overhaul agencies and is currently using, P/N 195860, master rod bearings.

DC-4—Routine inspection during service revealed crack in spar tang at No. 3 nacelle outboard lower attach angle bolt hole. Crack extended from forward edge of tang through bolt hole and approximately ⅛" into body of spar. DACO recommended fix being accomplished. Aircraft TT approximately 29,000:00 hours. Fleet being campaigned.

No. 4 engine feathered due to overspeed. Metal found in sump. Probable cause of failure, oil starvation due to No. 4 engine oil tank hopper breaking loose causing excessive damage to tank allowing large amounts of aluminum to plug oil screen. Fleet campaign run on DC-4 oil tank hopper installation.

HELICOPTER

Bell Model 47—Chain-Tail Rotor Control P/N-47-722-189-3—Accelerated wear of the chain connecting link and pin has been observed on inspection.

Tube Drag Brace P/N-47-110-1442—Crack was suspected in subject part because of stain in cadmium plating. Magnetic particle inspection confirmed condition.

Hiller Model 12A—Anti-torque Rotor Hub P/N-55014-1—Failure of tail rotor was caused by incipient corrosion in spline areas on hinge pin holes within tail rotor hub assembly. The manufacturer recommends the use of lubriplate or "Par-Al-Ketone" in servicing the tail rotor.

PIPER

PA-12—(Lycoming O-235C) Engine Intake Tubes (manifold)—At major overhaul, intake tubes were found loose where they enter oil sump.

PA-22—Wiring Assembly—Solenoid to Fuse Block P/N-14230-37—Inspection of subject assembly disclosed chafing of the wire against left seat. Apparently chafing takes place only when seat is adjusted in the forward position.

Housing Covering Left Rudder Cable—Left rudder cable was found contacting subject housing. Affected area is located in baggage compartment, under housing.

CURTISS

Model C-46—Inspection of right elevator revealed cracked lead counterweight on leading edge of elevator 10" inboard of outboard hinge, 5th hinge, at mounting bolt. Inspection of cracked lead counterweight revealed plate nut for mounting bolt had threads stripped causing bolt to loosen and counterweight to crack. Replaced plate nut. Replaced counterweight.

Model C-46A—While taxiing out for takeoff, lost hydraulic pressure. Towed back to line. Hydraulic system empty. Found leak in tail gear retract cylinder

swivel fittings. Repaired and aircraft released. En route Newark, hydraulic pressure again dropped off, system chattered erratically. Gear lowered mechanically. Landed without incident. Probable cause was excessive air pressure in system fracturing line.

CONVAIR

Model 240—Cancelled account during taxi from gate left hand outboard main gear axle failed in brake assembly attach flange radius. Brake assembly damaged. No other damage to the aircraft. This is the third incident of this type experienced by this airline. Inspection of all main gear axles in the break flange radius using dye penetrant was immediately established as a repetitive periodic check item (140:00).

While parking aircraft brake anvil broke completely off. Brake was supported only by the brake line. Inspection revealed a crack about 4 inches long which originated at the upper inboard radius of the anvil throat. Changed the brake assembly. Reaccomplished FCD 339C dyepenetrant inspection of left main gear axle in radius adjacent to outboard side of brake flange. Condition of axle found normal.

Model 340—During walkaround inspection No. 2 wheel hub half, P/N 39530801 — Goodyear, was found cracked with drive ring missing. Wheel and brake assembly changed. Inspection of wheel hub revealed crack originated under drive ring and proceeded the entire circumference of the hub. Hub TT 7736:00 hours. TSO 203:00 hours. Hub is being returned to manufacturer. Initiated inspection of drive ring area of hub with Dy-Chek at each removal of ring.

When executing emergency procedure for landing which includes dropping of flares, found they would not release. One flare fell free when plane first contacted runway and ignited. Other flare partially dislodged and was safetied by ground personnel for taxi to blocks. Flare irregularity indicated flare frozen in can caused by leakage from lavatory drain water. Investigation revealed the leakage from the K-702 FG-4D valve due to foreign material created the runback.

GENERAL

Prevention of Static Discharge at HF Antenna

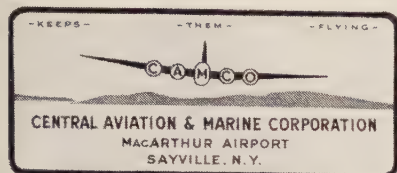
The nose, vertical stabilizer, and antennas of any airplane are usual points of highest static build-up; painted airplanes are more susceptible to such build-up than unpainted aircraft.

Operators experiencing excessive static discharge from HF antenna are advised to check between antenna-clip screwhead and antenna disconnect for proper gap.

Maintenance information on business aircraft, especially the Lockheeds and "light twins," is difficult to obtain. This bulletin is intended to serve as an exchange medium for any pertinent information you may care to make available. Let's hear from you! ENI

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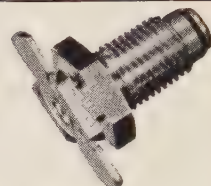
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Deluxe Super-92 DC3

New ship guarantee on airframe, 800 hour guarantee on engines. Completely disassembled and rebuilt. Luxurious interior, with all large cabin and picture windows. Lightweight landing gear doors, Collins and Bendix executive radio, many extras. Today's fastest and quietest DC-3, 210 miles per hour.

Grumman Goose

New three bladed full feathering props, all metal wing, new relicense with fresh overhaul on airframe and engines (with crankshaft modification). New executive interior, new exterior paint. Another Goose also available, now beginning overhaul, ready for your specifications.

Custom 18

New ship guarantee on freshly overhauled airframe, 800 hour guarantee on engines. Painted exterior, de-icers, radome, large cabin windows, enlarged interior, modified front bulkhead, lavatory, snack bar, special seats. Dual instrumentation, autopilot, Sperry H5 horizon and C2 gyrosyn compass, Collins 51R omni with 51V glide scope, isolation amplifier, dual speakers, many extras.

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Airline DC3

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Twin Beechcraft

C18, new relicense, Hamilton Standard full feathering hydromatic props, metal flaps and ailerons, oleo drag legs, nose tank, complete paint, dual instrumentation, Collins 17L3-51R omni, 51V2 glideslope, Sperry electric gyro horizon, autopilot, A.R.C. T11-R15 standby VHF, VTR omni-transceiver, ADF, Etc. Excellent condition, \$19,500. Also available with less radio for lower price, if desired.

Low Time C47s

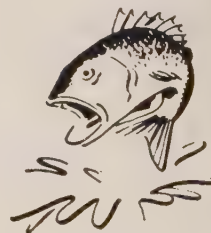
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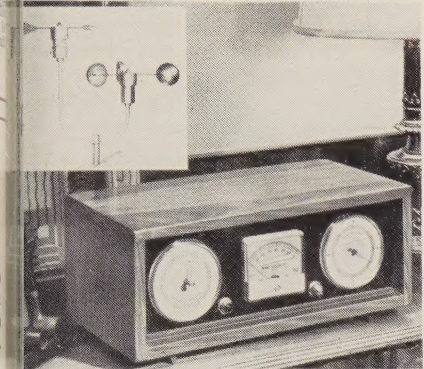
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Desk Style Weather Forecast

Weather forecasting in the office can be done with the Weatherminder, engineered for safety, dependability, accuracy and long life, according to manufacturer Texas Electronics, Inc., Dallas, Tex.

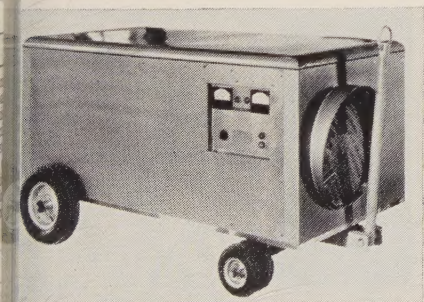
The Mark III model gives barometric pressure, wind velocity in mph and wind direction. The highly precise instruments are housed in a modern hand-



sculpted, solid walnut console with a gold and black instrument panel. The exposed roof unit is of gold anodized aluminum for rust-proof, trouble-free operation.

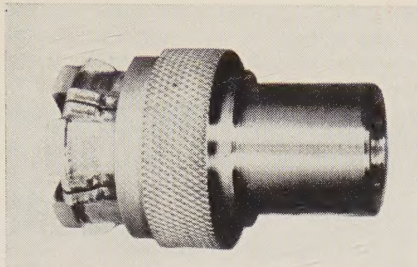
Aircraft Ground Power Supply

Aircraft Ground Power Supply units for starting reciprocating engines, recharging batteries, providing power to check radar and other navigational equipment and providing standby power to conserve batteries when aircraft are on the ground are manufactured by Sel-Rex Corp., Nutley, N. J. Model S15C24V, shown here, is equipped with over-size rubber tire wheels and rated at 24 Volts D.C., 15 amperes and features special weather-guard construction for safe outdoor use.



Steel Bolt Has Plastic Lock Action

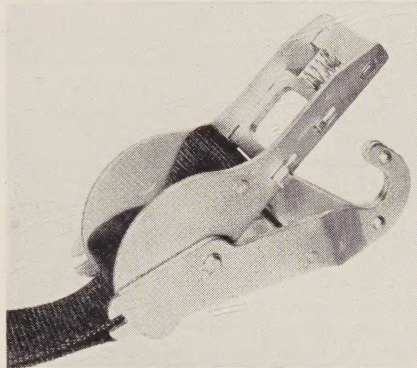
Designed to provide a four-way answer to the problem of bolt assemblies, the self-locking Nylock bolt locks wherever wrenching is stopped. It is vibration-proof, liquid tight and adjustable. Locking takes place by means of a permanent nylon plug in the side of the bolt. The nylon plug wedges opposite mating threads together and locks whether or not the bolt has been seated. Intended to withstand the most ex-



treme vibration, the bolt "grows" tighter hours after it is applied. This is because the nylon plug seeks its original shape after being spread out during wrenching.

The plug effectively blocks fluid flow around the helix of the threads. It is resistant to moisture, ordinary solvents and provides a permanent seal.

It is available in sizes from No. 10 to 1-inch diameter. It is produced by Bolt and Chain Div., Republic Steel Corp.



High Stress Cam Type Buckle

A Weblock 5,000-lb cam type buckle for heavy duty aircraft applications has been developed by General Logistics Div., Aeroquip Corp., Pasadena, Calif.

Buckle has smooth cam with no teeth. Primary use is for high stress tie-down operations. Webbing tightens manually by lifting back of buckle to the front, then snapping back into position.

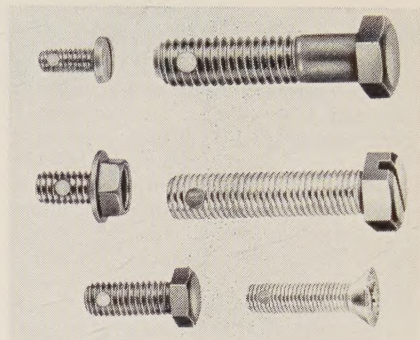
Portable Dictation Machine

For the flying executive, a portable dictation machine, book-size and 4½ lb, is offered by Peirce Dictation Systems, Inc., Chicago.

The machine operates on two self-contained batteries as well as on office, plane, car and home currents.



The magnetic belt dictation medium holds 15 minutes of dictation and is transcribed on standard office units. Belts may be mailed in ordinary envelopes, filed or re-used.



12-Jaw Stud Attachment Fitting

Development of a 12-jaw stud attachment fitting has been made by General Logistics, subsidiary of Aeroquip Corp.

The 12-jaw fitting does not depend upon springs. Its jaws are positively released by the motion of a sliding lock ring and cannot stick in the closed position. Uses include attachment and removal of aircraft equipment and accessories such as seats, tables, galleys, stanchions, cargo tiedown and lavatory fixtures.

Lock ring of the fitting is held in closed position by a shouldered detent and cannot be moved by shock loads or "g" forces.

Jaws are made of wrought metal for greater strength.



Contemporary Executive Air Chair

A custom-designed contemporary executive aircraft chair with 360-degree swivel is styled in club height with various back heights available. The seat back is adjustable to 70 degrees off upright. Ottoman-type leg rest that pulls out of seat pan may be ordered. Chair may be designed for special track mounting.

Designer and manufacturer is Hardman Tool & Engineering Co., Los Angeles, Calif.

Safety Digest

(Continued from page 33)

feet in length and may be spread as a continuous line, or alternate fixtures may be extinguished by the control tower. These lights are intended to bring out runway marking and texture, thus providing better height sensitivity and directional guidance just prior to and after touchdown.

Mousetrapped . . . By Minutes

When was the last time YOU made a range approach under actual weather conditions? A year? . . . two years? "Strictly a GCA or ILS man" you say? That's fine, when GCA and ILS are available. But what if you've a load of priority cargo to deliver to a destination that lists "no radar, no ILS, range only?" The answer is simple: you make a range approach, watch your time and listen to the dahs and dits. That's all there is to it. But like all things simple, the margin for error becomes very narrow. Leave out one ingredient and you are in *real* trouble. Just to see exactly how much trouble can develop during a "simple range approach," let's join a qualified crew holding on a range awaiting approach clearance to a base.

During holding time, about 45 minutes, approach control has called three times urging an approach because of inbound traffic.

Conflicting weather reports have been received ranging from 600 feet and $\frac{1}{2}$ mile visibility to 2,000 and 10 miles visibility. With each report, the pilot elects to hold, awaiting a more reliable indication of existing weather conditions.

At 1114 local time, weather is requested and reported as 600 feet overcast, $1\frac{1}{4}$ miles visibility. The pilot departs the holding pattern, crosses the range station and tunes his No. 2 ADF to the outer marker. Normal station pas-

sage is received. Difficulty is encountered in getting the No. 1 ADF to home so it is tuned to the range with the selector left in the antenna position.

After passing the outer marker, the No. 2 ADF is tuned to the inner marker as the aircraft continues to descend to minimum altitude. On passing the outer marker, the copilot points down to the ground and indicates that he has visual contact. Everything looks good.

Within a few seconds, the pilot takes a look outside and indicates that he is also contact. He estimates the visibility to be two miles. Suddenly a ragged ceiling is encountered, and scud clouds begin to sweep under the nose. We are back on the gauges—and no one has seen the runway. The strip of concrete is 9,000 feet long and about 200 feet wide—copilot, do you see it? His wrinkled brow is the answer.

Maybe a quick check should be made of the let down chart, but there isn't time. . . . TIME? Has anyone been checking the time? How long since departing the range station? Three minutes? Five minutes? There are hills around here, hills that rise fast. And the range . . . is anyone listening to the range? The Northeast leg runs directly down the runway. . . . Push the headset against the ears . . . is that a clear N? It is! DAH DIT! . . . DAH DIT!

The pilot calls for "Max power . . . gear up!" The engines quickly respond. The copilot reaches for the gear handle, but it's too late. The trap is closed.

It happens in an instant. The extended left gear slams into the sloping hillside followed by the No. 1 propeller, left heater pod, wing and the fuselage. Daylight bursts in from a crazy angle as the whole bottom of the flight deck rips away letting in a cloud of dirt mixed with bits of metal. A broken triangular window in the upper right corner of the cockpit offers an escape from the burning wreckage. Five crewmen quickly squeeze through the open-

ing to safety. Three in the cargo compartment die in the crash.

That's the story, with a "you are there" approach. The investigation revealed that no one kept track of the time from the range station. Flying at 135 knots, five minutes and 25 seconds would be required to reach the field. The crash, which occurred six miles beyond the field, required an additional flying time of two minutes and 40 seconds.

Between the range station and the runway were two radio beacons. Passage of the first beacon—the outer marker—was noted by the crew on the No. 2 ADF. The ADF was then tuned to the inner marker but passage was not observed by either the pilot or copilot.

As we stated in the beginning, "There's nothing to a range approach. All you have to do is watch your time and listen to the dahs and dits . . ." MATS Flyer

Variables of Takeoff Roll

The Chairman of the TWA Central Airline Safety Committee of ALPA, made the following comments on variables of takeoff runs he experienced on a recent test flight:

"I was astonished at the magnitude of difference in takeoff roll which results from minor variations in wind velocity.

"As I recall, the rule of thumb is that the runway roll distance varies 100 feet for each knot of wind.

"This would mean, of course, that a pilot accustomed to taking off with a 15 knot head wind component, should he elect to take off with a 5 knot tail wind component, would roll 2,000 feet further down the runway. This is nearly 50 percent of the length of some of the runways we use, and is more than 50 percent of the normal takeoff roll for some of our aircraft."

(ALPA Technical Talk for Pilots) END

Birds of a Feather



Situation: Simulated instruments in the old Beechcraft. One pilot under the louvered hood. Range approach, just short of low station at an actual altitude of about 2,500 feet. The contact pilot (on the right side) closed the right throttle to simulate an engine failure.

Goof number one: The hooded pilot feathered the right engine.

Goof number two: The contact pilot reached across the pilots' compartment to unfeather the starboard engine. In the shuffle the left engine got feathered!

Goof number three: The machine this time. Neither engine would unfeather!

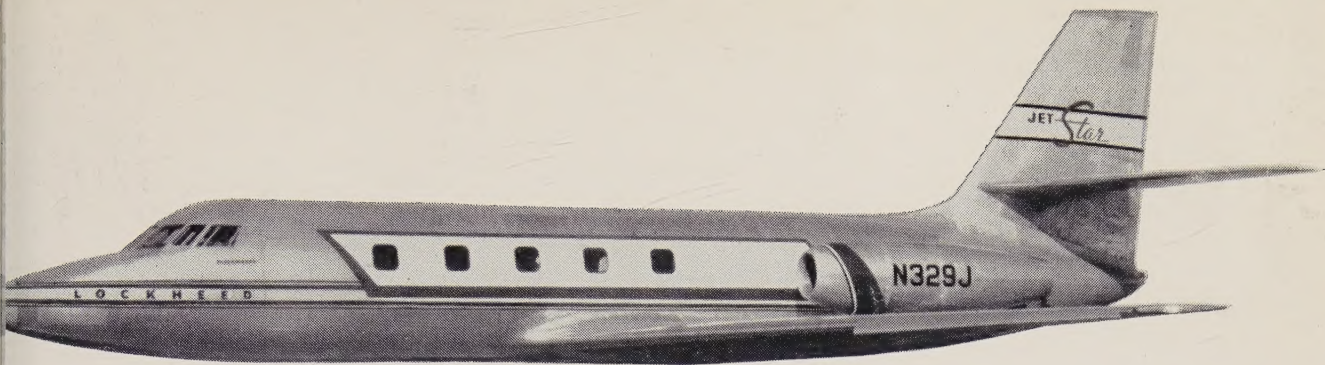
Results: None, except that a couple of pilots got a lot of education. The hood was removed and the plane was landed with essentially zero power at the field to which the approach was being made.

The pilots who flew this particular machine regularly, stated later that if a pilot feathered an engine he might not be able to get it out. There was no indication of this on the last few gripe

sheets, and it ground-checked fine.

Recommendations: Nothing new here. Never feather an engine on a simulated engine failure unless briefed to do so, and then only at an altitude of 5,000 feet or above. If an engine is to be feathered, on a simulated or actual emergency, wait until everything settles down and then carefully feather the bad engine. Never let the fingers get in a hurry around those feathering buttons, either to get an engine in or out of feather.

Approach—USN



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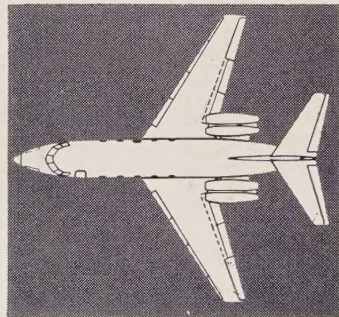
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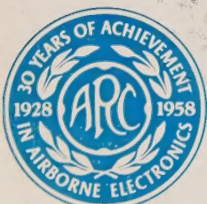
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most successful contributions to air navigation. Its low weight and compactness make dual installations practicable even in the light twins. If you are planning to modernize your existing radio installation, or are about to purchase a new aircraft, we urge you to specify ARC's Type 21A ADF for a long term investment in air safety. Ask your ARC dealer for a quotation on the Type 21A ADF and on other ARC equipment listed below.

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